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LECTURES

ON

PHYSIOLOGY, ZOOLOGY,

AND THE

NATURAL HISTORY OF MAN,

DELIVERED AT

The Royal College of Surgeons,

BY

W. LAWRENCE, F. R. S.

Professor of Anatomy and Surgery to the College, Assistant Surgeon to St. Bartholomew's
Hospital, Surgeon to Bridewell and Bethlem Hospitals, and to the London
Infirmary for Diseases of the Eye.

WITH SEVEN ENGRAVINGS.

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TO

I. F. BLUMENBACH,

PROFESSOR IN THE UNIVERSITY OF GOTTINGEN,
AULIC COUNSELLOR, FELLOW OF THE ROYAL SOCIETY OF LONDON,
OF THE ROYAL ACADEMY OF SCIENCES OF PARIS,
&c. &c. &c.

* * *

DEAR SIR!

THE principal subject of the following pages has received its most numerous and successful illustrations from your sagacity, industry, and learning.

Having freely availed myself of your labors,—although with that occasional dissent in matters of opinion, which I doubt not will be more agreeable to the liberality of so enlightened a Philosopher, than invariable servile adoption,—I think it a mere act of justice to dedicate this Work to you. I do so with the greater pleasure, because it affords me the opportunity of gratefully acknowledging the instruction and entertainment which I have derived from your excellent writings; of recommending to imitation the example you have set, of combining together anatomical, physiological, and zoological pursuits, and advancing them by reciprocal illustration; and of expressing individually that high sense of your public services and merits, which is felt generally by all the friends of science.

I remain,

DEAR SIR,

With the sincerest esteem and respect,

Your very obedient Servant,

W. LAWRENCE.

College of Physicians,
8th Feb. 1819.

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LECTURES

ON

PHYSIOLOGY, ZOOLOGY,

AND THE

Natural History of Man.

LECTURE I.

INTRODUCTORY TO THE COURSE DELIVERED IN 1817.

Reply to the Charges of Mr. Abernethy.—Modern History and Progress of Comparative Anatomy.

GENTLEMEN:—

I CANNOT presume to address you again in the character of Professor to this College, without first publicly clearing myself from a charge publicly made in this theatre;—the charge of having perverted the honorable office, intrusted to me by this Court, to the very unworthy design of propagating opinions detrimental to society, and of endeavoring to enforce them for the purpose of loosening those restraints, on which the welfare of mankind depends.*

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* *Physiological Lectures, exhibiting a General View of Mr. Hunter's Physiology, and of his Researches in Comparative Anatomy; delivered before the Royal College of Surgeons by* J. ABERNETHY, F. R. S. See particularly Lect. 1, 2, 6, and 7: the passages and pages are too numerous to be particularized. Had the author been content with pronouncing his attack from the chair of the College, I should have been satisfied with defending myself in the same place. The publication of his charge has made it necessary for me to publish my reply.

The apparent contradiction between the allotted subject of these *Physiological* Lectures,—*human* anatomy; the professed topic,—Mr. Hunter's know-

I feel obliged to call your attention to this subject;—not by the probability of the accusation, and still less by the arguments adduced in support of it;—but, because the character of the accuser may with some, supply the deficiency of proof;—because the silence of contempt, which the illiberality and weakness of the charge would so well justify, might be construed by others into an admission of guilt;—and, if I could appear before you

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ledge of *comparative* anatomy; and their actual contents, anatomical, physiological, ethical, controversial, abusive, &c. &c.; is only to be reconciled by a consideration of the real motives, which may be discovered without a very deep research. That the few remarks on life, published in my "Introduction to Comparative Anatomy and Physiology," should have been the sole occasion, and have furnished so much of the subject of these Lectures, was an honor altogether unexpected and unwished on my part. If it should be thought that I do not show a proper sense of so distinguished a compliment, by bestowing in return so short a notice on the "Physiological Lectures," more particularly when nearly all the opinions and facts they contain would afford ample matter for discussion, my apology must be want of room, and not being yet fully convinced that the pretended *Hunterian* theory of life is the most important subject that can be entertained by the human mind. This slowness of belief must be pardoned in a modern sceptic.

Not to fatigue his audience by too much of one thing, however good, the author judiciously interspersed his views of the so-called Hunterian doctrine, and his series of anathemas against the designs, principles, and character of the audacious sceptics who refuse to accept the gracious present, with other topics; and did not disdain to intermix the most elementary anatomical truths. Thus we learn that the head is placed on the top of a column of bones called vertebræ (p. 108); that the seven upper ribs are connected by *gristles* to the breast bone (121); that there are two bones of the fore-arm; and that the ulna sends backward a projection we name the elbow (126); that the wrist is composed of eight *little* bones (129); &c. &c. &c. When we consider that the audience, to whom these Lectures were delivered, comprised the venerable elders of our profession, appointed to guard the portals of the great edifice in Lincoln's-Inn-Fields; the general body of London surgeons, who having been admitted within the gates, must be deemed accomplished in all parts of anatomical and surgical science; and the students of the several schools of medicine, who, having devoted one winter at least to anatomical pursuits, must be presumed to possess the *a b c* of the science; and when we further reflect that the author would undoubtedly be governed in his selection of subjects by a deliberate view and sound estimate of the wants of his audience, we are naturally anxious to know for which of the three classes above mentioned these "Early Lessons" in anatomy were designed. Perhaps, however, like the water in a medical prescription, they were only meant as an innocent vehicle for the more active ingredients.

under the possibility of such an admission, you might reasonably suppose me indifferent to your approbation or blame, and therefore unworthy of the office which I now hold.

I am not going to drag you again over the field of controversy:—my opinions are published:—they were not brought forward secretly;—they have never shunned the light, and they never shall be concealed nor compromised. Without this freedom of inquiry and speech, the duty of your professors would be irksome and humiliating: they would be dishonored in their own eyes, and in the estimation of the public. These privileges, GENTLEMEN! shall never be surrendered by me: I will not be set down nor cried down by any person, in any place, or under any pretext. However flattering it may be to my vanity to wear this gown, if it involves any sacrifice of independence, the smallest dereliction of the right to examine freely the subjects on which I address you, and to express fearlessly the result of my investigations, I would strip it off instantly.

I willingly concede to every man what I claim for myself,—the freest range of thought and expression; and am perfectly indifferent whether the sentiments of others on speculative subjects coincide with or differ from my own. Instead of wishing or expecting that uniformity of opinion should be established, I am convinced that it is neither practicable nor desirable; that varieties of thought are as numerous, and as strongly marked, and as irreducible to one standard, as those of bodily form; and that to quarrel with one, who thinks differently from ourselves, would be no less unreasonable than to be angry with him for having features unlike our own.

To fair argument and free discussion I shall never object, even if they should completely destroy my own opinions; for my object is truth, not victory. But when argument is abandoned, and its place supplied by an inquiry into motives, designs, and tendencies, the case is altered. If vanquished in fair discussion, I should have yielded quietly; but it cannot have been expected that I would lie still, and be trampled on, lecture after lecture; cut and mangled with every weapon fair and foul; assailed with appeals to the passions and prejudices, to the fears of the timid, the alarms of the ignorant and the bigoted: and this too, when nothing is easier than to destroy the ill-constructed fabric; to crumble its very fragments to dust, and scatter them before the wind.

It is alleged that there is a party of modern sceptics, co-operating in the diffusion of these noxious opinions with a no less terrible band of French physiologists, for the purpose of demoralizing mankind! Such is the general tenor of the accusation, independently of the modifications, by which it is worked up into separate counts, and of the rhetorical ornaments, by which it was embellished. Had the statement been general, I should not have appropriated it by entering on a defence;—but have left that service to any volunteer of the sceptical party, which I know no more of than I do of the man in the moon, and in whose existence I believe just as much. The quotation of my own words, however, rendered it impossible for me to shield myself under the pretext of uncertainty; indeed, it particularized and fixed the accusation, for which no other tangible object could be discovered.

The vague and indefinite expressions of sceptical party, modern sceptics, and other abusive terms, form too flimsy a veil to conceal the real object of this fierce attack; while the pretended concern for important truths and principles, and the loud imputation of bad designs and evil tendencies, instead of decently covering, rather expose the nakedness of the feelings, in which it originated.

Perhaps all the counts of this alarming indictment are not intended to apply to all the persons thus unexpectedly dragged to the bar of public opinion;—but, as the prosecutor made no distinction in the shades of guilt, I must plead to the whole accusation:—of propagating dangerous opinions,—and of doing so in concert with the French physiologists:—the French, who seem to be considered our natural enemies in science, as well as in politics.

I plead, not guilty; and enter on my defence with a confident reliance on the candor and impartiality of the tribunal, before whom the cause is brought;—a tribunal too enlightened to confound the angry feeling and exaggerated expressions of controversy with the calm deductions of reason; and well able to appreciate this attempt at enlisting religion and morality on the side of self-love; by which difference of opinion, at all times but too irritating to the human mind, receives the double aggravation of real inability to persuade, and fancied right to condemn.

Where, GENTLEMEN! shall we find proofs of this heavy charge. —of this design so hostile to the very elements and foundation of civil union? What are the overt acts to prove this treason against society? this compassing and imagining the destruction of moral restraint, and the grounds of mutual confidence? What support can you discover for such imputations in the profession, pursuits, habits, and character of those who are accused? How will it promote their interests to endanger the very frame of society? By what latitude and artifice of construction, by what ingenuity of explanation, can the materials of such a charge be extracted from the discussion of an abstract physiological question? from discourses first delivered in this theatre to an assembly of the whole profession, and since openly published to the whole world? I need not remind you that such an accusation is repelled by every appearance, every probability, and every presumption; and that in opposition to these primâ-facie sources of distrust, it can only be established by the clearest and most unequivocal evidence; not by bold assertions and strained inferences—not by declamatory common-places on morals—nor by all the pangs and complaints of mortified self-love.

A party of modern sceptics!—A sceptic is one who doubts;—and if this party includes those who doubt,—or rather, who do not doubt at all,—about the electro-chemical doctrine of life, I can have no objection to belong to so numerous and respectable a body. The assent of the mind to any proposition cannot be forced;—it must depend on the weight of evidence and argument. I cannot adopt this hypothesis until some proof or reasoning of a very different nature from any hitherto produced shall be brought forward. I declare most sincerely, that I never met with even the shadow of a proof that the contraction of a muscle or the sensation of a nerve depended in any degree on electrical principles; or that reflection, judgment, memory, arise out of changes similar in their causes or order to those we call chemical. On the other hand, I see the animal functions inseparable from the animal organs;—first showing themselves, when they are first developed; —coming to perfection as they are perfected;—modified by their various affections;—decaying as they decay; and finally ceasing, when they are destroyed.

Examine the mind, the grand prerogative of man. Where is the mind of the fetus? where that of the child just born? Do we not see it actually built up before our eyes by the actions of the five external senses, and of the gradually developed internal faculties? Do we not trace it advancing by a slow progress through infancy and childhood, to the perfect expansion of its faculties in the adult;—annihilated for a time by a blow on the head, or the shedding of a little blood in apoplexy;—decaying as the body declines in old age;—and finally reduced to an amount hardly perceptible, when the body, worn out by the mere exercise of the organs, reaches, by the simple operation of natural decay, that state of decrepitude most aptly termed second childhood?

Where then shall we find proofs of the mind's independence on the bodily structure? of that mind, which, like the corporeal frame, is infantile in the child, manly in the adult, sick and debilitated in disease, phrensied or melancholy in the madman, enfeebled in the decline of life, doting in decrepitude, and annihilated by death?

Take away from the mind of man, or from that of any other animal, the operations of the five external senses, and the functions of the brain, and what will be left behind?

That life then, or the assemblage of all the functions, is immediately dependent on organization, appears to me, physiologically speaking, as clear as that the presence of the sun above the horizon causes the light of day; and to suppose that we could have light without that luminary, would not be more unreasonable than to conceive that life is independent of the animal body, in which the vital phenomena are observed.

I say, *physiologically* speaking; and beg you to attend particularly to this qualification: because the theological doctrine of the soul, and its separate existence, has nothing to do with this physiological question, but rests on a species of proof altogether different. These sublime dogmas could never have been brought to light by the labours of the anatomist and physiologist. An immaterial and spiritual being could not have been discovered amid the blood and filth of the dissecting-room: and the very idea of resorting to this low and dirty source for a proof of so exalted and refined a truth, is an illustration of what we daily see, the powerful bias that professional habits and the exclusive contemplation of a particular subject give even to the strongest minds,—an illustration of that esprit de métier, which led the honest currier in the threatened city to recommend a fortification of leather.

When we reflect that the immortality of the soul and a future state of rewards and punishments were fully recognised in all the religions of the ancient world, except the Jewish,—and that they are equally so in all those of more modern time;—when we consider, that this belief prevailed universally in the vast and populous regions of the East, for ages and ages before the period to which our remotest annals extend, and that it is firmly rooted in countries and nations on which the sun of science has never yet shone, the demonstration that the anatomical and physiological researches of the last half century have not the most remote connection with, or imaginable influence on, the proof of these great truths, will be completed beyond the possibility of doubt or denial, in the estimation of every unprejudiced person. I do not enlarge on this point, because it is too obvious, and because divinity and morals, however excellent in their own time and place, do not exactly suit the theatre, audience, or subject of these Lectures.

The greatest of the ancient philosophers said that the surest way of gaining admission into the temple of wisdom, was through the portal of doubts—and he declared that he knew only one thing—his own ignorance. Were Socrates to show his head above ground just now, he must conclude, either that he himself had completely mistaken the road to knowledge, or that his successors had accomplished the journey, and had penetrated into the sanctuary of the temple. For, in the modern philosophy, doubting is proscribed as the source of all mischief; and an overbearing dogmatism, even on the most abstruse and difficult questions, is held forth as a wiser course than the modest confession of ignorance.

When favorite speculations have been long indulged, and much pains have been bestowed on them, they are viewed with that parental partiality, which cannot bear to hear of faults in the object of its attachment. The mere doubt of an impartial observer is offensive; and the discovery of any thing like a blemish in the darling is not only ascribed to an entire want of discrimination and judgment, but resented as an injury. The irritation rises higher, in proportion to the coolness of the object which excites it; as Sir Anthony Absolute in the play, while swelling with rage, and boiling over with abuse on the persons around him, begins to damn them again with tenfold energy because they cannot keep their tempers, because they cannot be as cool as he is.

By a curious inconsistency in the human mind, difference of opinion is more offensive and intolerable in proportion as the subject is of a more refined nature, and less susceptible of direct proof. Hence the rancorous intolerance excited by the minute and almost evanescent shades of opinion that distinguish many religious sects. The quarrels of the Homoousians and the Homoiousians filled the Roman empire for a long series of years with discord, faction, persecution, and civil war. Yet the point at issue, actually comprised in the variation of a single dipthong, is so minute as to be "scarcely visible to the nicest theological eye,*" and certainly, in reference to either faith or practice, is not a jot more important than the controversy which divided the mighty empire of Lilliput, respecting the right end to break in eating an egg. 'Tis a pity we cannot find some convenient way of settling these *important* controversies; such as occurred to the traveller, who met with a people divided into two parties on the question whether they should walk into the temple of their deity with the right or the left leg foremost. Each side conceived the practice of the other to be impious: the traveller recommended the obvious expedient, which in the heat of their quarrel they had overlooked, of jumping in with both legs together.

The peculiar virulence of controversy, in all cases in which religion is supposed to be concerned, is so remarkable, as to have become proverbial:—the odium theologicum is the most concentrated essence of animosity and rancour. Let us not then open the fair garden of Science to this ugly fiend; let not her sweet cup be tainted by the most distant approach of his venomous breath.

Is the cause of truth to be promoted by affixing injurious and party names to those who differ from us in these points of nice and curious speculation? who cannot pursue the same track with ourselves through the airy regions of immaterial being, of which the only utility seems to consist in affording occupation to the organs of ideality, and mysticism? Is not this kind of abuse more likely, by moving the passions, to disturb the operation of the judgment?

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* Gibbon.

The practice of calling names in argument has been chiefly resorted to by the fair sex, and in religious discussions; in both cases, apparently, from a common cause—the weakness of the other means of attack and defence. The priests of former times used to rain a torrent of abusive epithets, as heretic, infidel, atheist, and the Lord knows what, on all who had the audacity to differ from them in opinion. This ecclesiastical artillery has been so much used, as to have become in great measure unserviceable: it is now found more noisy than destructive; and the general discovery of its harmlessness has assisted with the progress of liberal ideas, to discountenance its employment in controversy, as poisoned weapons and other unfair advantages have been banished from honorable warfare. Sometimes, however, it frightens and stuns, if it does not dangerously wound; and thus it silences antagonists, who could not easily have been overcome by weight of argument.

It would have been praise enough to any doctrine, that it should explain the great mystery of life; that it should solve the enigma, which has puzzled the ablest heads of all ages;—but this subtile and mobile vital fluid is brought forward with more ambitious pretensions; and it is not only designed to show the nature and operation of the cause, by which the vital phenomena are produced, but to add a new sanction to the great principles of morals and religion, and to eradicate all the selfish and bad passions of our nature. An obscure hypothesis, which few have ever heard of, and fewer can comprehend, is to make us all good and virtuous, to impose a restraint upon vice stronger than Bow Street or the Old Bailey can apply; and in all probability to convert the offices of Mr. Recorder and his assistant Mr. Ketch into sinecures.*

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* Let us suppose for a moment that the adoption of this hypothesis would really have all the efficacy that is pretended, it would then be desirable that it should turn out to be true: but would that afford any proof of the hypothesis? If, in a disputed question, you tell me that I shall have a large estate, if I am convinced that you are in the right; undoubtedly I shall desire with all my heart to find that you are right: but I cannot be convinced of it, unless your

What has been the effect of this great discovery on its author?—What are the first-fruits of this new ethical power?—A series of Quixotic attacks on conspirators and parties, as purely imaginary as the giants and castles encountered by the Knight of La Mancha; of unfounded charges and angry invective, undisguised and glaring national partiality, unreasonable national antipathy, unmerited and unprovoked abuse of the writers of a whole nation, afford an overwhelming proof of its complete moral inefficacy.

These magnificent designs are interrupted by a conspiring band of sceptics and French physiologists,—by a nest of plotters brought forth all at once on this green table, and threatening, in the noise and alarm which preceded their discovery, as well as in their utter insignificancy and harmlessness when discovered, to eclipse even the green-bag conspiracy of another place. The foundations of morality undermined, and religion endangered by a little discussion, and a little ridicule of the electro-chemical hypothesis of life! Thus the possessor of a specific endeavors to frighten people by the most lively pictures of their danger; that they may receive, with a higher opinion of its virtues and importance, his pretended infallible remedy.

I shall not insult your understandings by formally proving that this physiological doctrine never has afforded, and never can afford, any support to religion or morals: and that the great truths, so important to mankind, rest on a perfectly different, and far more solid foundation. If they could be endangered at all by the discussions, with which we amuse ourselves, it would be by unsettling them from their natural and firm establishment in the natural feelings and propensities, in the common sense, in the mutual wants and relations of mankind, and erecting them anew on the artificial and rotten foundation of these unsubstantial speculations, or on the equally unsafe ground of abstruse metaphysical researches.[*]

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arguments should be found satisfactory. In the same way, in tossing up for heads and tails, if I am to receive a guinea provided tails turn up, and a hundred if it should be heads, this difference does not at all increase the chances of the latter event, however it may operate on my wishes.

[*] The profound, the virtuous, and fervently pious Pascal acknowledged, what all sound theologians maintain, that the immortality of the soul, the great truths of religion, and the fundamental principles of morals, cannot be

As to the charge itself, of bringing forward doctrines with any *design* hostile to the principles or opinions, on which the welfare of society depends: or with any other *intention*, except that of displaying to you the impartial result of my own reflections and researches; I reply in one word,—that it is false. I beg you, indeed, to observe, that I have only remarked on the opinions of others; I have adduced none of my own. I profess an entire ignorance of the nature of the vital properties, except in so far as they are disclosed by experience; and find my knowledge on this subject reduced to the simple result of observation, that certain phenomena occur in certain organic textures.* To the question, what opinions I would substitute in place of those to which I object, I answer none. Ignorance is preferable to error: he is nearer to truth, who believes nothing, than he who believes what is wrong.

And here I take the opportunity of protesting, in the strongest

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demonstrably proved by mere reason; and that revelation alone is capable of dissipating the uncertainties, which perplex those who inquire too curiously into the sources of these important principles. All will acknowledge, that, as no other remedy can be so perfect and satisfactory as this, no other can be necessary, if we resort to this with firm faith. How many persons could be found whose belief in a Deity rests on the chain of reasoning in CLARK's *Demonstration of the Being and Attributes of God;* or in KANT's *Einzig mögliche Beweisgrund zu einer Demonstration des Daseyn Gottes?* How many are there who have had perseverance enough to go through the chain of argument in these works? If the close and profound reasoning and the metaphysical acuteness of CLARK and KANT have been employed to little purpose on such a subject, what are we to expect from this pretended Hunterian theory of life?

* The author of the *Physiological Lectures* entertains some peculiar views concerning the evidence, on which we are to rely in our physical researches, which probably furnish a clue to the peculiar results at which he has arrived. He "confides more in the eye of reason than in that of sense; and would rather form opinions from analogy, than from the imperfect evidence of sight;" p. 203, where the expression is employed in discussing a question of fact. The same statement, in nearly the same words, occurs in several other places.—From a comparison of these passages with each other, and wtih the leading doctrines of the lectures, I consider their meaning to be, that when the evidence of the senses is at variance with preconceived notions, or the constructions, combinations, or other operations of the mental faculties, the author rejects the former and adheres to the latter. As the author must be the best judge of the relative value belonging to the evidence of his own senses and that of his fancy, imagination, and other internal powers, it is fair to presume

terms,—in behalf of the interests of science, and of that free discussion, which is essential to its successful cultivation,—against the attempt to stifle impartial inquiry by an outcry of pernicious tendency; and against perverting science and literature, which naturally tend to bring mankind acquainted with each other, to the anti-social purpose of inflaming and prolonging national prejudice and animosity. Letters have been called the tongue of the world; and science may be regarded in the same light. They supply common objects of interest, in which the selfish unsocial feelings are not called into action, and thus they promote new friendships among nations. Through them, distant people become capable of conversing; and losing by degrees the awkwardness of strangers, and the moroseness of suspicion, they learn to know and understand each other. Science, the partisan of no country, but the beneficent patroness of all, has liberally opened a temple where all may meet. She never inquires about the country or sect of those who seek admission;—she never allots a higher or a lower place from exaggerated national claims, or unfounded national antipathies. Her influence on the mind, like that of the sun on the chilled earth, has long been preparing it for higher cultivation, and further improvement. The philosopher of one country should not see an enemy in the philosopher of another: he should take his seat in the temple of Science, and ask not who sits beside him. The savage notion of a natural enemy should be banished from this sanctuary, where all, from whatever quarter, should be regarded as of one great family; and being engaged in pursuits calculated to increase the general sum of happiness, should never exercise intolerance towards each other, no assume that right of arraigning the motives and designs of others, which belongs only to the Being who can penetrate the recesses of the human heart;—an assumption which is so well reprobated by our great poet:

> Let not this weak unknowing hand
> Presume thy bolts to throw;
> And deal damnation round the land
> On each I judge thy foe.

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that he has exercised a sound discretion in this very important determination It is however rather unreasonable for him to expect that others should rely on the workings of his fancy in preference to the evidence of their own senses

* * *

In the Introductory Lecture* of last year, I attempted to sketch out to you the history of Comparative Anatomy; to select the names of those who had been principally concerned in establishing and advancing the science; and to assign to each his proper share of praise. At the same time that I found it a pleasing task to review the successive steps in the progress of so interesting a science, and to award the just tribute of our gratitude to so many useful labors, I thought it would be interesting and profitable to you to know to whose talents and to whose exertions zoology had been indebted.

The space allotted to this historical review having been necessarily short, the names of many were omitted; and others were noticed more briefly than the number, extent, and importance of their contributions to science would have deserved. This was particularly the case with many illustrious foreigners, towards some of whom I shall now make up for that neglect.

The temple of science has not been raised to its present commanding height, or decorated with its beautiful proportions and embellishments, by the exertions of any one country. If we obstinately shut our eyes to all that other nations have contributed, we shall survey only a few columns of the majestic fabric, and never rise to an adequate conception of the grandeur and beauty of the whole. Our insular situation, by restricting intercourse, has contributed to generate a contempt of foreigners, and an unreasonable notion of our own importance, which is often ludicrous; always to be regretted; and in many cases strong enough to resist all the weapons of reason and ridicule. We should consider what we think of these national prejudices, when we observe them in others: when we see the Turks summing up all their contempt for their more polished neighbors, in the short but expressive phrase of Christian dogs; and the Emperor of China acccepting presents from the King of England, because it is a principle of the celestial empire to show indulgence and condescension towards pettty states.

Science requires an expanded mind, a view that embraces the universe. Instead of shutting himself up in an island, and abusing all the rest of mankind, the philosopher should make the world his country; and should trample beneath his feet those prejudices, which the vulgar so fondly hug to their bosoms. He should sweep away from his mind the dust and cobwebs of national partiality and enmity, which darken and distort the perceptions, and fetter the operations of intellect.—If the love of science and liberal views are not sufficient to repress the noisy obtrusion of national claims, considerations of policy may furnish the motive. The country which has really done the most for science, will certainly be the last to assert its pretensions; and a readiness to allow the merits of others will be the most powerful means, next to modesty and diffidence, of recommending our own to attention. If we could come to the strange resolution of attending only to what has been done by Englishmen in comparative anatomy and zoology, we should have to go back in the science fifty years or more: in short, to a state of comparative darkness. For such it must be deemed, if we excluded the strong light which has been thrown on these subjects from Italy, Germany, and France.

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* See *Introduction to Comparative Anatomy and Physiology*.

The only parallel to such a proceeding is that afforded by the Caliph OMAR, in his sentence on the Alexandrian Library. This ignorant fanatic devoted to the flames the intellectual treasure, accumulated by the taste, the learning, and the munificence of many kings; observing, that the books, if they agreed with the Koran, were superfluous, and need not be preserved; if they differed from it, impious, and ought to be destroyed.

If this extraordinary kind of exclusion were realized, what would be the result? A great national idol must be set up; and we should be compelled to bow down and worship it, under the penalty of being thrown into the burning fiery furnace of offended national pride.

At the first institution of the French Royal Academy of Sciences, towards the middle of the century before the last, some of its members occupied themselves with the very useful undertaking of observing and dissecting several animals, of describing and illustrating them by figures. The value of their labours is sufficiently attested by their having been several times republished in various forms, and translated into Latin, English, and other languages. Being drawn entirely from observation, their histories will ever possess the value inseparable from faithful delineations of nature. They have described forty-seven animals, and represented their external figure and internal structure, in ninety folio plates. As examples of their knowledge, it will be sufficient to mention, that you will find in their work an account of the cells in the camel's stomach, which hold the water,—a point of structure and economy so strikingly suited to the parched and sandy regions of Asia and Africa, which these animals inhabit: all communication and commerce across these extensive wastes would be impossible without a race of animals possessing that power of bearing the privation of water, which this structure confers.—They describe the air-cells and the gastric glands of birds; and the curious mechanism of the membrana nictitans, or third eyelid. Of many animals we know little more, to the present day, than what they have told us.

When we consider that the Royal Academy of Sciences, to whose members we owe these splendid and useful labors, was founded by Louis XIV, and his minister Colbert; when we review the long list of illustrious names which adorn the annals of that body; and bring together the almost numberless accessions to every branch of science, which have been the fruit of their exertions through the reign of their despotic founder, and his no less despotic successors down to the present time;—we are reluctantly compelled to acknowledge, that the encouragement of this branch of human knowledge (the sciences) is not confined to free forms of government, and that there is nothing peculiarly hostile to their progress, even in the most despotic. Absolute rulers indeed, so far from having any interest in shackling or impeding scientific or literary inquiries, have an obvious and strong motive for aiding and promoting them. They afford a safe and harmless employment to many active spirits, who might otherwise take a fancy to look into politics and laws,—to investigate the source, form, duties, and proceedings of governments, and the rights of the governed. A wise despot will be glad to see such dangerous topics exchanged for inquiries into the history of a plant or animal; into the properties of a mineral or the form of a fossil; into the uses of a piece of old Roman or Grecian crockery; or the appropriation of a mutilated statue to its rightful owner in some heathen goddery. Shutting out the human mind from some of its most interesting and important excursions, he will open every other path as widely as possible.

When the French Academicians discontinued their researches and publications, the opportunities of zoological inquiry, which the royal menageries had afforded them, passed into the hands of Buffon and Daubenton, who employed them with equal industry, and equal advantage to science. When the direction of the Jardin des Plantes was confided to Buffon, he formed the twofold project, commensurate in boldness and magnificence with his own genius,—that of assembling select and well-arranged specimens of all natural productions, to exhibit to mankind the fertility and variety of nature, and the formation of a more durable monument, on which he proposed to engrave the history or annals of this admirable nature. The immensity of the design, which he was well aware of, did not discourage him from the attempt: it only excited him to extend his resources by calling in other aid. His discernment discovered the very qualities he wanted, in the modest, patient, persevering, yet zealous Daubenton, who was born at the same place with himself (Montbar in Burgundy,) and with whom he had been acquainted from infancy. Destined by his father for the church, Daubenton went to Paris to study theology, but he applied in secret to medicine, and particularly anatomy: and when his father's death allowed him to pursue the bent of his own inclination, he adopted the medical profession, and began to practice it in his native place, when Buffon invited him to Paris, and procured for him the situations of keeper and demonstrator of the cabinet of natural history. Their association presented the singular spectacle of two men with high yet different qualifications, uniting their efforts without impairing their energy, and combining the lights they derived from various sources only to increase their intensity, and to threw them with greater effect on the objects they both wished to illuminate. In the great work, so honorable to the country which gave it birth, containing the result of their associated labors, the share contributed by Daubenton is the internal and external description of 182 animals, several of which had neither been observed nor described before by naturalists. The useful facts accumulated by him, in the course of many years devoted to this undertaking, are presented in a form so unpretending, that they are overpowered and thrown into the back-ground by the grand and imposing general views, the beautiful particular descriptions, and the eloquence at once majestic and captivating, of the French Pliny.

So great were the care and accuracy of DAUBENTON, in registering the facts which he observed, that, in spite of their number, we can hardly detect an error. He admitted nothing, but what he saw himself; without indulging in those bold hypotheses, for which BUFFON had so marked a predilection; without even drawing those general conclusions, which might have been most naturally deduced from his observations. Here perhaps his reserve was excessive; and it is in this respect CAMPER observed of him, that he did not know himself how many things he had discovered.

The anatomical descriptions and plates of DAUBENTON are, in many instances, the most valuable part of the work which passes under the name of BUFFON: and they will retain this value, as the sterling coin bearing the stamp of nature ever does; while the base metal of hypothesis and speculation, detected by a little wearing, is soon consigned to contempt and oblivion. DAUBENTON therefore, although the author of no work published in his own name (except some papers in the Memoirs of the French Academy of Sciences,) will ever be regarded as one of the first in that list of illustrious moderns, who have prosecuted the study of zoology with enlarged views and on proper principles.

CAMPER and PALLAS were cotemporary with DAUBENTON. Animated with the true feeling for nature, they devoted themselves to her study with that enthusiasm which characterizes genius. The zoologists of Europe have assigned to them, with one accord, the highest rank in the temple of Science; and point them out with one consent, as belonging to that small class who have contributed signally to extend the boundaries of natural knowledge.—Where will any sceptical opponent of their claims find justification ofhis dissent from the public voice so strongly expressed in their favour? Let him seek it in their works, and his doubts will soon be at an end.

Although CAMPER occupied at different times the chairs of philosophy, anatomy, surgery, and medicine at Francker, Amsterdam, and Groningen,—although he filled various civil situations, and wrote on many subjects in anatomy, midwifery, surgery, medicine, and the fine arts, he found leisure for his favorite pursuits. He collected a very valuable museum in comparative anatomy, made numerous dissections of rare and interesting animals, and delineated their structure in that simple but expressive style, in which he has given us the admirable engravings of the arm and pelvis. The air-cells in the bones of birds, their communications and uses: the organ of hearing in fishes and whales; the anatomy of the orang-utang, the elephant, the rein-deer, and the Surinam toad: the organs of the voice in monkeys, the head of the two-horned rhinoceros, and fossile osteology, are some of the subjects which he has successfully illustrated.*

No man entered the path of zoology with greater ardour, or pursued it with more perseverance and success, than PETER SIMON PALLAS, the son of a surgeon of Berlin. His whole life indeed was only a succession of labors devoted to the extension of natural knowledge. In passing over the wide field of zoology the student will see his name in all quarters, and everywhere as the index of some important discovery. Should he wish to survey any part of the territory more minutely, PALLAS will be his safest guide. He published eighteen separate works, several of them bulky, and in many volumes: and he contributed fifty-five papers to various learned societies.†—When the value of writings is so universally recognised, as in the case of a HALLER and a PALLAS, their numerical amount is a measure of the obligations under which science lies to their authors. He acquired very rapidly the learned and the modern languages, and studied natural history, anatomy, physiology, and the other branches of the medical profession, under the best teachers that Germany and Holland afforded. His taste for zoology was strongly marked at the age of fifteen, when he sketched out an arrangement of birds on his own notions, and made observations on the larvæ of the lepidoptera, particularly with the view of determining whether they possess the sense of hearing, which he settled in the affirmative. His Inaugural Thesis, *De infestis viventibus intra viventia* (that is, On animals which live in the bodies of others,) published in 1761, when he was nineteen years of age, is still read with information and pleasure; although the important subject, on which it treats, has received so much additional light from the researches of subsequent naturalists. At the time of its appearance, this production of the young Pallas was much the best book for the information it contained and the views it disclosed. He proves in it, from his own investigations, the vitality of the hydatid; and demonstrates the structure of the head of the tape-worm: he also shows the general objections to the Linnæan class Vermes. For the purpose of prosecuting his favourite pursuits of zoology and comparative anatomy, he visited various parts of the continent, and England: employing himself particularly on the coasts in investigating the structure and habits of marine animals, many of which he has described. His *Elenchus Zoophytorum*, a work both copious and profound, his *Miscellanea Zoologica* and *Spicilegia Zoologica*, most rich repositories of information on various departments of our science, were published within a few years after his Inaugural Thesis. These valuable works fully justify the eulogium of the judicious and impartial Haller, who pronounces their author "one of the chief founders of comparative anatomy."

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* His various works are enumerated in the *Notice de la Vie et des Ecrits de P. Camper*, prefixed to the *Œuvres*, tom. i.

† A short account of the life of PALLAS has been published by his friend RUDOLPHI, in his *Beyträge zur Anthropologie und allgemeinen Naturgeschichte*, 8vo. Berlin, 1812. It contains a complete catalogue of his numerous writings.

Zoology had hitherto been to Pallas a kind of passion, rather than an ordinary pursuit; he followed the impulse of his ardent feeling for nature, without looking to ulterior objects. His zeal, talents, and information, could not fail to attract attention; and they pointed him out to the great Catharine,—who seemed to feel for science a kind of manly love, and who promoted it like an Empress,—as a proper person for her truly grand design of exploring the vast regions that owned her sway, of describing the countries, their productions, and inhabitants. His histories of these travels abound with information on all points: I may particularly mention, in reference to our present subject, his very interesting descriptions of the various native tribes scattered over the immense regions of Asiatic Russia, and previously very imperfectly known; and his copious details in zoology.

The fatigues of these travels impaired a constitution never very robust; and a subsequent less extensive excursion in the southern regions of the Russian empire weakened it still further. Yet he afterwards published his *Novæ Species Quadrupedum e Glirium Ordine*, the best monography we possess in the class Mammalia, and distinguished by characters which few naturalists have been able to impress on their writings. He not only accurately describes the animals, and their anatomy, but details their habits, and in many cases adds valuable physiological information on their temperature.

After living some years in the Crimea, on estates given him by the Empress, he returned, towards the close of his life, to Berlin; where, for some months before the event, he was admonished by pain and increasing weakness of his approaching end. Like many professors of our art, he obstinately refused to take physic; exhibiting that want of faith, which, whether or not it diminishes the chance of salvation, certainly amuses the profane. He died as he lived, engaged in zoological pursuits; for his last occupation was that of arranging papers, and giving directions for a grand work he had been long preparing on the animals of the Russian empire; destined to illustrate their structure and functions, as well as natural history. This,[*] or at least some portion of it, is printed, but I believe not yet published.

Perhaps it is not necessary to insist on the merits of HALLER in comparative anatomy, before an audience undoubtedly familiar with the works, and therefore fully able to appreciate the greatest ornament of our profession. I must however observe, that he saw the subject in its just light: he perceived clearly that the physiology of an organ could not be complete until its structure had been examined in every class of animals,—until all its modifications and their effects had been noted. Hence each section of his immortal work contains a collection of all the facts then known respecting the structure of animals as well as of man.

At this favorable era, when the spirit of inquiry was awakened, and active minds in all parts of Europe were engaged in zoological and physiological investigations, Mr. HUNTER commenced his career. He enjoyed the great advantage, of singular importance to an uneducated and unlearned man, of being initiated in these pursuits by his brother, the most accomplished and learned anatomist, and then the most acute physiologist, of this or any other country. From Dr. W. Hunter, who first taught him, and from the numerous able men brought up in the same school, Mr. Hunter learned in the shortest way whatever could be derived from books, and became acquainted with the labors and discoveries of all other countries.* Thus his genius was excited and invigorated, without being deadened by the toil of study,—refreshed by these supplies, it became capable of higher and stronger flights, and soared to an elevation, which we cannot estimate justly without taking into consideration the point of departure. Yet he never forgot that the physiologist is the minister and interpreter of nature; and however little conversant he may have been with human works, no man ever consulted with a more attentive and scrutinizing eye the book of nature, which always instructs, and never deceives us. His museum will teach us how he endeavored to learn the structure,—and the records of his observations and experiments will show how he inquired into the actions of living beings. Such were the means in his opinion best calculated to unfold the nature of life: the characters of which he has drawn, not with the wavering outline and undefined forms of speculation, nor in the gaudy and delusive tints of hypothesis, but with the firm touch that real observation alone could give, and in the sober coloring of that nature with which he was so well acquainted.

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[*] *Animalia Imperii Rossici.* RUDOLPHI informs us, in his life of PALLAS, that he had seen the text of the first volume, and part of the second; and gives some account of the object and contents of the work. *Beyträge*, s 55. u. folg.

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* The unrivalled opportunities of education and information enjoyed by Mr. Hunter are very properly stated by the author of the Physiological Lectures, p. 8. He surprises us afterwards by comparing him to Ferguson the astronomer, who became acquainted with the phenomena of the heavenly bodies, and constructed charts and instruments, while a shepherd's boy. In original instruction, in acquaintance with the most improved state of science, and with the labors of those by whom it had been thus advanced, the two individuals exhibit a complete contrast, instead of resemblance. The representation that Mr. Hunter was the first, in this or in any country, who studied comparative anatomy and physiology extensively, in order to perfect the knowledge of our own animal economy (Physiol. Lect. p. 5 and 201), seems to me as unfortunate as the comparison of Hunter to Ferguson. Without mentioning Galen, whose labors, although he lived so many centuries ago, ought not to be forgotten; without enumerating the long list of illustrious men who devoted themselves with so much zeal and success to comparative anatomy and physiology in the 17th century, whose names are connected with all the leading discoveries in those sciences; and whose works, occupying the sixth book of Haller's *Bibliotheca Anatomica*, under the title of "Animalium Incisiones," contain many of the facts published as new by the moderns; the name of Harvey immediately suggests itself, as sufficient to refute this assertion. The researches of this great man on the circulation and generation, show that he was fully aware what assistance might be derived from the dissection and observation of animals in illustrating the structure and functions of man, and that he knew well how to avail himself of it. See *Introduction to Comparative Anatomy and Physiology*, p. 41 et seq.

He seldom ventured into the regions of speculation; and the fruits of his excursions, when he did thus indulge himself, are not calculated to make us regret they were so few. They bear indeed the marks of the common weakness of our nature; and remind us of the observation applied to the theological writings of Sir Isaac Newton,—that they afford to the rest of mankind a consolation and recompense for the superiority he displayed over them in other respects. I forbear any further disquisition of his merits, because they have already been sufficiently explained to you this year; and particularly in reference to our present subject of comparative anatomy; because too, the frequent repetition of the theme might lead you to entertain those doubts and suspicions which uncommon earnestness and reiterated recurrence often suggest, when they do not arise naturally out of the subject.

Comparative anatomy is still pursued with great zeal in Germany, where literature and science are resuming that activity which had experienced a short interruption from war,—the favorite, but costly and destructive game of princes, and indeed of people.

The structure, economy, and scientific classification of intestinal worms, have been illustrated by several German naturalists, —as, Pallas, Bloch, Goeze, and Werner,—whom I have already mentioned to you. The same subject has been again surveyed in all its parts, and has received many new illustrations from Professor Rudolphi of Berlin; whose *Entozoorum Historia*, or History of Internal Worms, besides much original matter, contains a complete collection of all that has been done on the subject, and an arrangement of the genera and species, which is now universally followed: it is indeed deservedly considered the first authority on this subject.

Tilesius, a German naturalist, who accompanied a late Russian voyage round the world, has delineated numerous animals.

particularly of the marine kinds, in the Atlas of **Krusenstern's** voyage.[*]

Dr. **Spix**, a Bavarian, has published a folio work[†] on the comparative osteology of the head, containing numerous plates, which are a good specimen of the new art of lithography or stone engraving.

Professor **Tiedemann**, of Landshut, gained a prize offered by the French Institute for the best account of the organs of circulation in the echinodermata; and has just published his essay,[‡] in folio, with several fine engravings, representing the whole anatomy of the holothuria, asterias, and echinus. This book (probably the only copy in the country,) and the work of **Spix**, are in the library of the Medical and Chirurgical Society. Many other publications in the various departments of zoology have appeared in Germany in the course of the past year.

We may form some judgment of the taste for these pursuits, which exists in other countries, from the fact that **Blumenbach's** *Manual of Natural History* has gone through nine editions. It is indeed remarkable for its clear arrangement, and for the immense quantity of interesting and valuable information it contains condensed into a small compass. It is altogether the best short elementary book on natural history in any language.

This great zoologist has not only contributed many new observations to the science, and enriched it with excellent elementary works, but he has collected a very extensive and valuable museum for the illustration of comparative anatomy and zoology. A similar collection has been made by **Soemmering**, at Munich.

Of the magnificent cabinet of natural history belonging to the Jardin des Plantes at Paris, report speaks very highly: it seems to be unrivalled, in the number, beauty, and arrangement of the specimens of the animal kingdom. Of the part which relates to comparative anatomy I have not met with any detailed account, except that the osteological department is peculiarly rich.

I have great pleasure in hearing that a zoological collection has been begun at the British Museum; because without such aid the study of the science must be prosecuted under great difficulties, and must necessarily languish. This department is under the direction of Dr. LEACH, whose zeal, abilities, and scientific knowledge are a sufficient assurance to us that nothing will be omitted which the zealous devotion of an individual can accomplish.

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[*] *Reise um die Welt.* Petersburgh.

[†] *Cephalogenesis, sive Capitis Ossei Structura.* Munich.

[‡] *Anatomie der Röhren-Holothurie, des Pomeranz-farbenen See-sterns, und des steinernen See-igels*: folio. Landshut, 1816; with ten beautiful and expressive engravings.

In the unrivalled library of SIR JOSEPH BANKS, and in the more uncommon liberality with which it is open to all who are engaged in scientific pursuits, the naturalists of this country enjoy an eminent advantage. The powerful and munificent patronage of this public-spirited individual is freely bestowed on all branches of science: it is not confined to the cold sanction of a bare assent, but takes the form of active and warm assistance in all scientific undertakings that promise to promote public utility. Zoology has been a favorite pursuit with himself: the tie of a common object united him closely to Mr. Hunter; and he has ever shown a disposition to promote the views of this College respecting the museum, which entitles him to the particular gratitude of its members; as his general character and conduct do to the warmest esteem and respect of all friends to science.

The zoologists of France still exhibit that activity and acuteness, by which the science has been so much benefited, and by which it receives every year important acquisitions. CUVIER has terminated his labors on the mollusca, by the anatomy of the cuttle-fish tribe: and has published together, in one volume, with thirty-two beautifully engraved plates, containing a very large number of figures from his own drawings, the whole of his important researches on this department of the animal kingdom. Those who are acquainted with this admirable work; who have appreciated the immense extent and variety of the researches on which it is founded, and the satisfactory clearness and accuracy both of all its details and of the general conclusions and arrangements founded on them, will be astonished to hear that its author has executed a series of investigations equally extensive on the vertebral animals, the zoophytes, on many insects and crustacea. He has not published them in the same way; but the preparations are deposited in the cabinet of comparative anatomy at the Jardin des Plantes, and will be employed ultimately in that great work on comparative anatomy, to which all the previous and apparently finished productions of this philosophical and accomplished zoologist are regarded by himself merely as a kind of prelude; although any one out of their great number would have raised its author to a distinguished rank in the scientific world.

This history and anatomy of the mollusca is not the only claim which Cuvier has to our gratitude within the past year. His work on the animal kingdom, in four volumes octavo, exhibits a methodical and philosophical view of the science of zoology: it places before us a subject capable of engaging and satisfying an inquiring mind; not a dry and uninteresting detail of names and forms, but the philosophical principles of zoological arrangement, and the execution of those principles through all their details: it establishes the divisions and sub-divisions of the living world through the whole of the vast scale, on the double basis of external and internal structure: it enumerates all the well-authenticated species which are known with certainty to belong to each subdivision; and enters into some details on those kinds which, from their abundance in these climates, the advantages we derive or the injuries we suffer from them, from singularities in their manners or economy, their extraordinary forms, beauty, or size, become objects of particular interest. Of the confidence which this work deserves as a representation of facts in contra-distinction from compilations the fruit of labors in the closet, we may form a judgment from this circumstance, that, with the exception of such animals as by their minuteness elude the researches of the anatomist, there are very few groupes of the rank of subgenera mentioned in the book of which the author cannot produce at least some considerable portion of the organs. In each division and each species we are referred to the best sources of information; not by indiscriminate and accumulated quotations, which only increase and perpetuate confusion,—but by the selection of those works and figures to which the character of originality belongs: in short, by weighing and not counting authorities. A very valuable catalogue of zoological authors is subjoined.

That it bears marks of haste, and does not in all parts correspond to what we expect from the most knowing and most learned (which are by no means synonymous epithets,) of modern zoologists, might well be expected, when we consider the wide field it embraces, the multifarious pursuits, and the important political and civil duties of the author: yet it is not less valuable than indispensable to every zoologist, as the most perfect delineation of the actual state of the science, as the most authentic and worthy of confidence in its details, and from the enlightened discrimination and criticism employed in the selection of authorities,

If any of my hearers have regarded zoology as an amusement, rather than a philosophical pursuit,—as something calculated to employ light minds, or occupy hours of leisure and relaxation,—I would recommend them to survey the distribution of animals presented in this work. They will find that the science, thus treated, is not only capable of affording an ample source of agreeable and interesting instruction and entertainment, but also, that, in exhibiting a methodical arrangement of a most copious and multifarious subject, it is a very useful exercise and discipline of the mind. This advantage, of distributing and classing a vast number of ideas, which belongs in a remarkable degree to natural history, has not yet been so much insisted on as it deserves: it exercises us in that important intellectual operation, which may be called method, or orderly distribution; as the exact sciences train the mind to habits of close attention and strict reasoning. Natural history requires the most precise method or arrangement; as geometry demands the most rigorous reasoning. When this art (if it may be so called) is once thoroughly acquired, it may be applied with great advantage to other objects. All discussions that require a classification of facts, all researches that are founded on an orderly distribution of the subject, are conducted on the same principles; and young men, who have turned to this science as a matter of amusement, will be surprised to find how much a familiarity with its processes will facilitate the unravelling all complicated subjects.

I do not enter into any detail of the accessions for which science is indebted to this illustrious naturalist, this great comparative anatomist; because the limits of a lecture would be insufficient. Neither do I mean to compare or contrast[*] his merits with those of any other individual; because I do not possess any gauge for the mind: I have no plummet for sounding the depth of intellect; nor any common measure by which its relative amount can be determined, under the different varieties of exertion. I should not be able to weigh genius against acquirements,

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[*] One object of the *Physiological Lectures* was, to contrast Mr. HUNTER's knowledge of comparative anatomy with that of CUVIER. The field of living nature has been surveyed and cultivated by these two great men with very different views and objects: by the former, for the elucidation of physiology: by

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the latter, for establishing the laws of zoology. It would have been interesting to show how the general course of proceeding, the mode of investigation, the selection of objects, and the result, have been modified by this diversity of design; and to point out the differences, which are traceable to the original diversity of endowment and of education. Such a comparison requires a mind free from the national affections and antipathies, in which the author of the *Lectures* glories: it requires, too, that an accurate parallel should be drawn of the labors and discoveries of each, and that all their respective writings should be well known. In the *Lectures*, there is no comparative statement of what these great men have accomplished; and the author gives us to understand. that of CUVIER's numerous important works he is acquainted only with his "Lectures on Comparative Anatomy." Yet he does not abandon the design, but addresses his audience as *Gentlemen of the Jury*, coming forward as "a voluntary advocate in the cause of HUNTER versus CUVIER and others." p. 16. In this mockery of a legal proceeding he has unfortunately omitted every one of the cautions and regulations which, in the justly-venerated forms of English judicial proceedings, are designed to secure impartial justice. Where is the enlightened judge, indifferent to both parties? where the impartial jury, any of whom may be challenged by the accused? where the advocate of the opposite party? He soon gets sick of his trial; does not even state the grievance complained of clearly; adduces not a particle of evidence; but uniting in his own person the characters of advocate, judge, and jury, and not hearing any thing in behalf of the defendant, of course pronounces a verdict for his own client. Who the *others* are, combined in this charge with CUVIER, or what they have been guilty of, we are not informed. This happy thought of a trial is again introduced, and accompanied with a compliment to British liberty (p. 334): it was a singular period to select for such an eulogium—for transplanting to the College of Surgeons the appeals to national vanity, which the increasing good sense and taste of the very galleries have nearly banished from the theatres.

Having disposed of CUVIER, the author makes very short work with HALLER, DAUBENTON, PALLAS, and CAMPER: thinking, apparently, that all merit allowed to them is so much clear loss to the object of his idolatry.

Having shown how erroneous the opinion is, that our science owes any great obligations to these individuals, and relying firmly on the ignorance of his audience in respect to dates, he arrives easily at the conclusion,—"that the great illumination which comparative anatomy and physiology have of late received on the continent, has in a considerable degree resulted from reflected light, originally emanating from materials which Mr. HUNTER brought together, and from his brilliant physiological discoveries." p. 61.

or to decide whether the quantity of discovery in one were equal to its quality in another. I can only state my own opinion; which is, that if it were necessary to point out any one man, as the chief contributor to the present state of zoology in general, and of comparative anatomy in particular, to designate any individual to whom the modern progress of these sciences has been principally owing, I cannot doubt that the naturalists of Europe would pronounce an unanimous verdict for CUVIER.

Yet perhaps they would not like to come to a decision in such a question, and would prefer returning a special statement, that should satisfy the claims of all, without conferring an offensive pre-eminence on any one. They might probably pronounce that the French academicians, that REDI, VALISNIERI, SWAMMERDAM, LYONNET, REAUMUR, DAUBENTON, and HALLER, had cleared the ground, dug out and laid the foundation of the building;—that CAMPER, PALLAS, HUNTER, POLI, BLUMENBACH, and CUVIER, had raised the edifice;—while innumerable other artists, by finishing particular apartments, or executing decorations and embellishments, had signally contributed, not only to the commodiousness and comfort, but to the general effect of the whole.

These great men, though born in different countries, may be considered to have been united as contributors to one common end—the advancement of useful knowledge. In reviewing their labors, let us keep our attention fixed on this object, and not look aside at the national questions, which divide and disturb mankind. We expect from science that it should strengthen feelings of benevolence, and promote acts of charity,—not encourage controversy, and inflame national rivalry; that it should draw more closely those bonds which unite men together; and not add fresh power to the repulsive forces which already separate them too widely.

LAMARCK is republishing, in an enlarged form, his Natural History of the Invertebral Animals; and has already completed four volumes.

SAVIGNY has made some very interesting discoveries in the same division of the animal kingdom; and has published them under the modest title of Memoirs on Invertebral Animals; of which two portions have already appeared.

MONS. BLAINVILLE, who succeeds CUVIER in his lectures at the Jardin des Plantes, in the course of many years silently and steadily devoted, under so able a teacher, to the study of natural history and comparative anatomy, has gained a most extensive stock of information on these subjects; and displays his thorough acquaintance both with their principles and details, in numerous Memoirs, chiefly contained in the Bulletin des Sciences, and other French collections.

It is perhaps yet too soon to determine how these and similar pursuits may be influenced by the recent political changes in France. Hitherto, however, Science has not partaken in the triumph of Legitimacy.

Le Sueur, the fellow-traveller of Peron, who had long promised a natural history of the Medusæ, to be illustrated by those inimitable delineations which he brought back from their voyage of discovery to the Austral regions, has found himself unable to complete this undertaking, and is gone, with many others, to the New World. If we cannot repress a sigh when we see men of peaceful pursuits thus torn from their native soil and driven into foreign climes, let us rejoice, not only for them, but for all mankind, that such an asylum for the victims of power and oppression exists; that there is, not a spot, but a vast region of the earth, lavishly endowed with Nature's fairest gifts, and exhibiting at the same time the grand and animating spectacle of a country sacred to civil liberty,—where man may walk erect in the conscious dignity of independence, that

> "Lord of the lion heart and eagle eye,"

and enjoy full freedom of word and action, without the permission of those combinations or conspiracies of the mighty, which threaten to convert Europe into one great State prison. The numerous people, whose happiness and tranquillity are so effectually secured by the simple forms of a free government, are the growth of yesterday: at the same rate of progress, they may reach in our lives as gigantic a superiority over the worn-out despotisms of the Old World, as the physical features of America, her colossal mountains, her mighty rivers, her forests, and her lakes, exhibit in comparison with those of Europe.

LECTURE II.

INTRODUCTORY TO THE COURSE OF 1818.

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The Cultivation of Zoology and Comparative Anatomy recommended as Branches of General Knowledge, and as an interesting Department of Philosophy— Their Relation to various Questions in General Philosophy, exemplified in the Gradations of Organization, and the doctrine of Final Causes—Examples of the Aid they are capable of rendering to Geology and the Physical History of the Globe—Their Importance to Physiology, and consequently to the Scientific Study of Medicine—Objects of inquiry in the Animal Kingdom, and Mode of Investigation—Anatomy—Physiology—Pathology.

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GENTLEMEN!

Having the honor of appearing before you for the third time, as professor of anatomy and surgery, I deem it a proper opportunity to observe, that the comparative estimate I originally formed of the exigencies of this office, and of the means I could bring forward for the purpose of meeting them,—which would, at all times have deterred me from presenting myself as a candidate for such a trust,—remains unaltered by my subsequent experience: or rather, that it has been confirmed by the nearer contemplation of a subject so arduous and ample, as to require the industrious devotion and undivided energies of an active and vigorous mind; and by the discovery of those deficiencies in knowledge, which the urgency of other avocations leaves me no hope of filling up. In pursuing the path which I have entered upon, I must, therefore, still rely on that indulgent consideration which I know that you are disposed to extend to all sincere efforts at promoting the grand objects entertained by the Court of this College;—I mean the diffusion, throughout our body, and particularly among its rising members, of a taste for all the auxiliary pursuits which are capable of lending to our profession either essential aid or graceful ornament;

the cultivation of surgery as a science; and the securing for its honorable practitioners that rank in society, and that public regard, which are the just meed of liberal pursuits directed to the attainment of useful public ends.

As the riches of our collection are more calculated for the leisure and deliberate survey of a visit to the museum, than for the distant and hasty exhibitions of this theatre, I shall preface the demonstrative part of the lectures by some general discourses, which will be devoted to illustrate the aim and utility of zoology in general, and of comparative anatomy in particular,—their relations to physiology, and to the sciences more immediately connected with our practical pursuits,—and the general principles, which are to be kept in view in cultivating these branches of knowledge. If, in this course, I should enter on topics which have been already brought under your review this season, my apology must be, that my arrangements were made before my worthy colleague had begun his lectures, and that amputation or dislocation of the parts in question would have been troublesome, if not painful operations.

His interesting disquisitions on various parts of comparative anatomy were not felt by me in the light of invasion or encroachment. The manor of living nature is so ample, that all may be allowed to sport on it freely; the most jealous proprietor cannot entertain any apprehension that the game will be exhausted, or even perceptibly thinned: to introduce any thing like the spirit of the game-laws into science would, if possible, exceed the oppressive cruelty and intolerable abuses of that iniquitous and execrable code.

Having alluded to the course of lectures just finished, I should not do justice to my own feelings, nor to the merits of my esteemed coadjutor,[*] if I did not sincerely thank him for the information I have received,—if I did not state, that, in listening to those luminous and eloquent discourses, I felt a satisfaction in belonging to a profession which could boast such an associate, and express a wish that a series of lectures so honorable to the author and to the profession should receive that diffusion by the press, which must be both useful and gratifying to the public.

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[*] Ant. Carlisle Esq.

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I KNOW no branch of knowledge more interesting to mankind in general, including all ages and descriptions, than the history of living beings, or, as we commonly call it, the natural history of animals: of which, comparative anatomy is the very life and essence. This pleasing subject occupies us at the first dawn of reason, amusing our earliest infancy; and supplies a fund of solid instruction and rational entertainment to our riper years and more developed faculties. In its boundless extent and variety are included matters within the comprehension of the slenderest and least cultivated understanding; and others, to which the strongest minds and most enlarged science are not more than adequate.

The resemblance which animals bear to ourselves in frame and actions, naturally leads us to ascribe to them our own feelings, to fancy that they are susceptible of our pleasures and pains, actuated by our desires and aversions, and impelled by the same motives or springs of action; and thus excites in the mind, even of the youngest and most unlearned, a sympathetic interest and a degree of curiosity, which are never felt in examining inorganic nature, or in contemplating its phenomena. None of the exhibitions in a fair are more crowded, by young and old, the ignorant and the learned, than the collections of foreign and curious animals: no books are more generally read, than descriptions of the form, actions, habits, instincts, and character of living creatures.

The knowledge of living nature, which is well worthy of cultivation, as a subject of mere amusement, at once innocent and rational, and therefore suited to all ages, presents other and higher claims to our attention. The multiplied relations which animals bear to our own species, supplying our most urgent wants, aiding our greatest undertakings, and giving full effect to our faculties and exertions,—and the important part they fill in the creation, animating and enlivening every scene, and often changing the very face of nature,—can hardly escape the notice of the most unreflecting; and can only be neglected by those who are contented to remain ignorant of the most striking phenomena around them. I do not speak at present of the important bearings which zoology has on the science of human organization and life, and consequently on the art of healing; but consider it merely as a branch of general knowledge.

What a multitude of quadrupeds, birds, and fishes afford occupation, either directly or indirectly, to the many savage tribes, who live almost entirely on the produce of the chase or the fishery, or to the sportsman, who seeks in these pursuits merely a healthy recreation! What an interest is felt in observing and investigating the habits of these various beings; in comparing and contrasting their diversified endowments; in watching the force and activity of some; the address, the stratagems, and the cunning of others; the wonderful instincts of all; and the curious relation between their habits and the respective situations they occupy!

What a number of the inhabitants of the earth, air, and waters, are sacrificed to furnish us with food! while from the same source we derive a still larger portion of our clothing. The number of living creatures, whether beasts, birds, and fishes, or even reptiles, worms, and insects, consumed for food, in the various regions of the earth, is prodigious. None, even the most disgusting, as locusts, beetles, maggots, spiders, entirely escape. When we add to these what are destroyed to supply us with clothing, particularly with wool, silk, leather, fur, feathers; with the means of procuring light, as oil, spermaceti, wax, tallow; with various articles of medicine, as hartshorn, musk, castor, Spanish flies; with the materials of numerous useful and elegant arts, as cochineal, parchment, glue, isinglass, catgut, bone, ivory, mother-of-pearl, hair, bristles, whalebone, horn;—and what are killed for our sport and amusement, or through abuse, wantonness, and cruelty;—the catalogue will be of immense length; and will amply justify Dr. SPURZHEIM in having marked out so considerable a tract, in his map of the human brain, for the abode of destructiveness, and its near neighbor and close ally, combativeness:—to say nothing of that circumstance which is almost peculiar to our species, viz. their killing each other;* a practice so essentially characteristic of human nature, that it prevails in every region and climate, in every variety of man, and in every state of society, from the rudest tribe of savages to the most highly civilized empire: except, indeed, among the Quakers, and one or two equally inconsiderable sects, whose singular and narrowminded refusal to follow the way of the world, in so innocent a particular, has been treated with suitable scorn and ridicule by their more enlightened fellow Christians.*

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* Besides war,—"the game," our poet calls it, "which, were their subjects wise, kings should not play at," but which, unluckily, subjects enjoy almost as much as kings,—I may refer to the human sacrifices, which either have been or are still practised in most parts of the world; and to cannibalism, which having been much doubted and questioned, is now clearly proved to be still prevalent in many places.

There are instances, in which whole tribes of human beings depend, for the supply of all their wants, on one or two species of animals. The Greenlander, and the Eskimaux of Labrador, placed in a region of almost constant snow and ice, where intense cold renders the soil incapable of producing any articles of human sustenance, are fed, clothed, and lodged from the seal. They pursue, indeed, the rein-deer, other land animals, and birds; but seal-hunting is their grand occupation. The flesh and blood of the seal are their food; the blubber, or subcutaneous stratum of fat, affords them the means of procuring light and heat; the bones and teeth are converted into weapons, instruments, and various ornaments: and the skin not only supplies them with clothing, but with the coverings of their huts and canoes. The stomach, intestines, and bladder, when dried, are turned to many and various uses: in their nearly transparent dry state, they supply the place of glass in the windows; they form bladders for their harpoons, arrows, nets, &c.; when sewed together, they make under-garments, curtains, &c.; and are employed in place of linen on many occasions. Thus every part of the animal is converted, by a kind of domestic anatomy, to useful purposes: even to the tendons, which, when split and dried, form excellent threads. To the pursuit of the seal, the canoes, instruments, weapons, clothing, education, and whole manner of life of the Greenlanders, are adapted. As a plentiful supply of these animals enables them to dispense with every thing else, and as without these they could procure neither dwellings, clothes, nor food, it naturally follows that the great aim of education is to make the boys expert seal-hunters; and that dexterity in this pursuit is the greatest praise that can be bestowed on the man.* The Laplanders and the Tungooses of North-eastern Asia, are equally indebted to the rein-deer; the Tschutski, the North-west Americans, the Aleutians, and other neighboring islanders, to the whale and walrus. The latter, as well as the Greenlanders, seem to have anticipated modern anatomists in accurately distinguishing the several anatomical textures, and ascertaining what BICHAT calls their "propriétés de tissue," or properties resulting from organization, in order to convert the various parts to the manifold purposes of their economical anatomy: they surprise us by manufacturing thread from the carcase of the great leviathan; splitting the fibres of its cutaneous muscle (the *panniculus carnosus*) into lengths of a hundred feet or more; and preparing from it a double-threaded twine, which, in the united requisites of fineness and strength, will bear comparison with any productions of European industry.

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* In complimenting the Quakers for not having followed the warlike and destructive example set before them by the rest of mankind, I ought not to have conveyed my praise in the ironical form of blame; because irony is often misunderstood, even where we may think such a mistake almost impossible,—as in the case of the good bishop, who declared himself highly pleased with Gulliver's Travels, but added, that the book contained some things which he had a difficulty in believing. To obviate the possibility of further misunderstanding, I lay aside irony, and state most seriously and sincerely, that, whether I regard them as a religious sect or as a body of citizens, whether I look to their private or public conduct, I hold the Quakers in the highest respect. As Christians, they entertain no unintelligible articles of faith; they waste no time in splitting the hairs of theological controversy; their singular and honorable distinction is practical Christianity, evinced in blameless lives, in renouncing all force and violence, in endeavoring to fulfil literally the Gospel precepts of peace and good-will, in active benevolence, in unremitted personal as well as pecuniary co-operation in all measures calculated to diminish the amount of human misery and suffering, and to improve the condition of their fellow-creatures. These truly Christian merits would redeem much heavier sins than an adherence to the plain and simple garb and the unceremonious language of George Fox and William Penn,

The flocks and herds which are reared for food, and the various domesticated animals employed in agriculture, in carrying burdens, for draft, and in numberless other ways, are so useful and important, that their structure, economy, and diseases, have been carefully studied; and these subjects have been found sufficient to occupy a particular class of persons. Indeed, without the dog, the horse, the sheep, the cow, the goat, the rein-deer, the camel, and the llama, many extensive regions of the globe would be uninhabitable; and others now covered with a numerous population, would be reduced almost to the condition of deserts.

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* See the interesting account of the Greenlanders in CRANTZ, *Geschichte von Grönland;* also EGEDE, *Description of Greenland;* Lond. 1818; of the Eskimaux, in ELLIS's *Voyage to Hudson's Bay*, p. 137 and following.

Comparative anatomy bears the same relation to the veterinary art, that human anatomy and physiology do to medicine. The peculiarities in the organic structure and functions of particular genera or species lead to corresponding peculiarities in their diseases and derangements. Hence a rational treatment of the disorders incidental to animals presupposes a knowledge of the generic and specific characters of internal organization. It seems superfluous to adduce the digestion of the ruminant order, or other analogous instances, in illustration of a truth so evident in itself.

Many animals are known to us as objects of alarm and terror, or of considerable though less serious annoyance. Some are directly formidable by their strength and ferocity, as beasts of prey; others by their noxious properties, as venomous reptiles and insects. Some ravage our fields and gardens, destroying the various vegetable productions: others attack our food and clothing. Some even perforate the planks of the largest ships, or the timbers of other submarine constructions.

A more extensive field is opened to the philosopher in the structure and economy of animals; in their analogies and differences: in the relation of their organization and functions to the circumstances in which they are placed; and in the modifications corresponding to the infinitely-varied combinations of abode, surrounding element, food, mode of growth and reproduction, &c. &c.

We see some sagacious and docile, capable of instruction, exhibiting mental phenomena analogous to our own,—the germs or imperfect state of what, when more developed, is human intellect: others are stupid, ferocious, and untameable. Some are mild, sociable, and gregarious; others, wild, savage, and solitary. Many surprise us by their curious instincts, as in providing for the abode, defence, or food of themselves or their offspring; by the unerring regularity with which each individual of the species, unaided by experience or instruction, obeys, as it were, the fixed law of destiny, in performing at stated periods the longest journeys, as in the migrations of birds and fishes; or executes the most perfect and intricate constructions, exceeding the utmost exertions even of human skill and wisdom.

Some have an acuteness of the external senses, particularly sight, hearing, and smelling, to which we are strangers; in some we are astonished by the force; in others, by the celerity and variety of motion.

Some live altogether on flesh; others, on vegetable matter: some eat incessantly, as our common graminivorous quadrupeds; others are satisfied with a full meal once a day, as the beasts of prey; and others, as certain reptiles, will eat only once in several weeks, and can even support an abstinence of many months.

To many animals, the interruption of respiration for a minute or two is fatal; some can go without breathing for an hour, for many hours, or for days; and others pass months together without the exercise of this function, in a condition of inactivity and torpor hardly distinguishable from death.

To many, a slight injury of some organ is fatal; some survive the loss of the most important members, and even reproduce them; some, when divided into two or more portions, have the power of forming an entire individual from each fragment.

It is the business of the philosophical zoologist to observe closely all the circumstances of these interesting phenomena, and of many other analogous ones; to trace their connexion with the rest of the economy, and with the peculiar organization of each animal: to compare together all the diversities and modifications; and thus to arrive, if possible, at the rational theory or just explication of their causes.

The gradations of organization, and the final purposes contemplated by Nature in the construction of her living machines, —two interesting and much agitated subjects in the philosophy of natural history,—receive their only clear illustration and incontrovertible evidence from comparative anatomy. Many naturalists have pleased themselves with arranging the animal kingdom in a successive series, according to external form; and have fancied it a peculiar mark of wisdom and beauty in the creation, that there are no abrupt changes, no breaks in the arrangement, but the most gradual and gentle transition from link to link throughout the whole chain. These views will not bear the test of impartial scrutiny, which soon destroys the belief in such a chain of beings, so far as the basis of external figure goes. On the other hand, the pursuits of zootomy, in unfolding the internal mechanism and its movements, display the most evident transitions and gradations of organization and economy. We see classes and orders,—as, for example, birds, and the testudines (the turtle and tortoise kinds,)—which, by their external configuration, are quite insulated in the creation, connected in the most natural manner with others of quite different form, and united to them by the principle of internal resemblance.

The four component parts of the upper extremity, viz. the shoulder, arm, fore-arm, and hand, can be clearly shown to exist in the anterior extremities of all mammalia; however dissimilar they may appear on a superficial inspection, and however widely they may seem to deviate from the human structure. The wings of the bat, osteologically considered, are hands: the bony stretchers of the cutaneous membrane being the digital phalanges extremely elongated. The dolphin, porpoise, and all other whales, have a fin on each side, just behind the head, consisting apparently of a single piece. But we find, under the integuments of this fin-like member, all the bones of an anterior extremity, flattened indeed, and hardly susceptible of motion on each other, but distinctly recognisable; there are, a scapula, humerus, bones of the fore-arm, carpus, metacarpus, and five fingers. The fore-feet of the sea-otter, seal, walrus, and manati, form the connecting links between the anterior extremities of other mammalia and the pectoral fins of the whale kind; the bones are so covered and connected by integuments, as to constitute a part adapted to swimming; but these are much more developed than in the latter animal, and have free motion on each other. The bones of the wing of birds have a great and unexpected resemblance to those of the fore-feet of the mammalia; and the fin-like anterior member of the penguin, applicable only to swimming, contains within the integuments the same bones as the wings of other birds which execute the very different office of flight.

The same point is illustrated by another kind of cases in comparative anatomy: viz. the existence of certain parts, generally in an imperfect state, or, in the anatomical phrase, as rudiments, in some animals, where the function does not exist, and where the parts therefore are not employed. It seems as if a certain model or original type, adapted to the intended function, had been fixed on as a pattern for the construction of nearly allied and analogous beings; and that this model had been adhered to, even in those cases where some particular function did not exist, and where, consequently, the corresponding organ was in reality unnecessary. The additional pelvic bones, which support the false belly or abdominal pouch of the marsupial animals, are found in the males as well as in the females; although the former have not the pouch. Several carnivorous animals have clavicular bones, connected merely to the muscles, and obviously incapable of serving, even in the smallest degree, those purposes for which true clavicles are added to the skeleton. The breasts and nipples of male animals are another example.

The marsupial bones and the milk-secreting apparatus of female animals are appointments of organization manifestly designed to fulfil certain ends, and accomplishing very essential purposes in the economy. In the male sex they are neither subservient to use nor ornament;. and seem, to our imperfect knowledge, to exemplify the prevalence, in animal organization, of a mechanical principle, of the adherence to a certain original type or model.

The olfactory nerves of the cetacea, in whom the blowing holes occupy the place of the nose, afford another instance—the more remarkable, as their existence has been generally denied, even by the greatest authorities in comparative anatomy. They consist in the porpoise of two white extremely slender filaments, which, although visible to the naked eye, cannot be distinctly recognised as nerves without a magnifying glass.*

No subject has been more warmly contested than the doctrine of final causes; which, however, has suffered more from the ill-judged efforts of its friends, than from the attacks of its enemies. We can hardly conceive that any person, who did not feel a difficulty in believing that a watch was formed for the purpose of showing the hour, could seriously doubt that our stomachs were expressly constructed for digestion, our eyes for seeing, and the rest of our organs for the purposes which they so admirably fulfil. But one must be very fondly attached to final causes, to persuade himself, as some have done, that the sea is salt to preserve it from putrefying; that the tides of the ocean are designed to bring our vessels safely into port; that stones are made to build houses with; and silk-worms created in China to furnish the belles and beaux of Europe with satins. It would be only one step further, to assert that sheep have been formed to be sheared and slaughtered; legs to wear boots; and the nose for spectacles.

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* Treviranus, *Biologie*, b. v. p. 342, tab. 4.

Blainville and Jacobson had already asserted the existence of olfactory nerves in the cetacea in the *Bulletin des Sciences*, 1815, p. 195.

In the work quoted above, Treviranus describes a very singular deviation from the ordinary arrangement, as occuring in the mole. A branch of the superior maxillary nerve goes to the eye, and forms the retina; while the optic nerves, about the size of hairs, are entirely unconnected with each other, and cannot be traced to the eyes. Ibid. p. 341, tab. 3.

Nothing indeed can be more truly unsatisfactory than the well-meant but worn-out complimentary effusions we are too often doomed to encounter, which, instead of evincing the wisdom of the creation, show only the folly of their authors, or at least, their misconceptions and short-sighted views. The physico-theologists seem to have considered it their duty to point out the end and purpose contemplated by the Creator in every natural arrangement: thus, they have sometimes fallen into the laughable absurdity of expatiating on the wisdom of certain provisions, which subsequent examination has proved not to exist at all.

The foot of an hymenopterous insect was described as being perforated in a certain part by minute holes;—immediately a sufficient use was discovered for this structure; it was described as a no less elegant than wise provision for sifting the pollen of plants, and thus applying the fine fecundating powder to the female organs; and, from the supposed structure and use, the creature received the name of *sphex cribraria.* Unluckily for the compliment thus designed to nature, the part was afterwards discovered not to be perforated.*

Others, again, have so firmly believed, not only the wisdom of creation, but their own insight into it, that they have called in question the existence of particular arrangements, because they could not discern the purposes to which they are subservient. Thus, when **Blumenbach** pointed out to **Camper** that the tadpoles of the Surinam toad *(rana pipa)* have tails[*], this great anatomist was disposed at first to deem the specimen a monstrosity;[†] because he could not comprehend for what purpose these strange beings, so curiously lodged in the dorsal cells of their mother, should have the swimming tail of the common tadpole.

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* BLUMENBACH, *Beyträge zur Naturgeschichte*, 1r. theil, p. 40, note.

A distinguished English naturalist has argued that the fossil elephant bones must belong to some species still existing; because, says he, " Providence maintains and continues every created species; and we have as much assurance that no races of animals will any more cease, while the earth remaineth, than seed-time and harvest, cold and heat, summer and winter, day and night." Unluckily for the credit of this gentleman's assumed acquaintance with the designs and schemes of Providence, we have the fullest evidence that many species and genera of animals have been annihilated.

The philosophic naturalist, guided by comparative anatomy, discovers at every step striking peculiarities in the economy of animals, founded on corresponding arrangements of organization. We must take refuge either in verbal quibbles, or in an exaggerated and unreasonable scepticism, if we refuse to recognise in this relation between peculiarity of structure and function those designs and adaptations of exalted power and wisdom, in testimony of which all nature cries aloud through all her works.

Many things are indeed, at present, inexplicable to us: thus, we cannot conceive to what purpose the long, slender, and almost circular canine teeth of the upper jaw of the babyroussa are subservient; and the offices of many parts, even in the human body, are still hidden from us. But the ends, or final purposes, of the Creator, will be placed in the strongest light by selecting any animal of marked peculiarity in its economy, and comparing together its structure and mode of life. Let a person, who knows the natural history of the mole, attentively contemplate its skeleton: if he should still withhold his belief in final purposes, he would probably coincide in opinion with a celebrated member of the French Academy of Sciences, who declared that it was as absurd to suppose the eye intended for seeing, as to imagine that stones were created for breaking heads.

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[*] *Abbildungen Naturhistorischer Gegenstände* No. 36

[†] *Beytr. zur Naturg.* p. 41, note.

I shall be contented with two other illustrations, which, although different from each other, are analogous in their purpose. The large cavities of birds, and the interior of their bones are filled with air,—thus they are rendered light and buoyant, capable of raising themselves into the higher regions of the atmosphere, of sustaining themselves with little effort in this rare medium, and of cleaving the skies with wonderful celerity. HUMBOLDT saw the enormous vulture of the Andes, the majestic condor, dart suddenly from the bottom of the deepest valleys to a considerable height above the summit of Chimboraço, where the barometer must have been lower than ten inches.* He frequently observed it soaring at an elevation six times higher than that of the clouds in our atmosphere. This bird, which reaches the measure of fourteen† feet with the wings extended, habitually prefers an elevation at which the mercury of the barometer sinks to about sixteen inches.

The mammalia which live entirely or principally in the sea, as the whale kind, the walrus, the manati, and the seals, are rendered buoyant in this dense fluid by a thick stratum of fat laid over the whole body under the skin. From this, which is called blubber, the whale and seal oil are extracted. The object of this structure in lightening these huge creatures, and facilitating their motions, is obviously the same as that of the air-cells in birds in relation to the element they inhabit.

A scientific acquaintance with the animal kingdom is not only valuable in its immediate reference to zoology and physiology, but it aids other sciences,—affording lights which are not merely useful, but absolutely indispensable in examining and illustrating other departments of natural knowledge. An exemplification occurs in geology, or the science which treats of the physical construction of our globe. Certain rocks and earthy strata contain vast numbers of shells, exuviæ of zoophytes, bones and teeth of large animals, besides other organic substances, in a fossil state.

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* *Recueil d'Observations de Zoologie et d'Anatomie comparée.* Essai sur l'Histoire Naturelle du Condor, p. 26, et suiv. pl. 8 et 9.

† MOLINA, *Storia Naturale di Chili*, cap. 4, s. 5. This measure is assigned, by SHAW to an individual described and figured by him; *Museum Leverianum* vol. I. pl. I.

Considerable mountains and extensive districts are sometimes composed entirely of such animal remains. It is the business of the naturalist to compare these organic remains of a former world with the corresponding objects in the present order of things; to determine their resemblances or differences,—whether they are of the same or of different species or genera; to compare the productions of the different strata to each other, and to distinguish those which have belonged to fresh, from those of salt-water animals; and, lastly, to ascertain whether the organic fossils of each country are like the living animals of the same, or of different and remote regions and climates. Such investigations require extensive and accurate information,—an acquaintance, both with the great outlines and minute details of nature; and belong therefore to an advanced stage of science. They have been commenced with zeal and industry by some of the greatest modern naturalists, and have led to highly interesting results. The bones of large quadrupeds found in such numbers in almost all the countries of the old and new Continent, have been discovered to belong to species, and even to genera, entirely new to us. One of these, an elephant, specifically distinguished both from that of Asia and Africa, has been met with in most parts of Europe, in countries and climates where no animal of the kind has ever been known in a living natural state, and in which the known species, inhabitants of the torrid zone, would be speedily destroyed. The fossil shells differ more or less from those of living species. In many places, several successions of fresh and salt water strata are discovered, indicating successive revolutions in the earth's surface, under the action of causes differing from each other in their nature. The inferior layers, or the first in order of time, contain the remains most widely different from the animals of the living creation, and, as we advance to the surface, there is a gradual approximation to our present species.

These examinations have furnished almost the only accurate data for any reasonable conclusions respecting the number, nature, and progressive series of the changes which have affected the earth's surface,—of the preadamitic revolutions of the globe; and they suggest matter for curious speculation respecting the extinct races of animals and the mode in which their place has been supplied by the actual species of living beings. The writings of CUVIER, BRONGNIART, and LAMARCK, in France, and of Mr. PARKINSON in this country, will give you the best information on this new kind of antiquarian research, on those authentic memorials of beings, whose living existence must be carried beyond the reach of history and tradition—beyond even the fabulous and heroic ages, and has been supposed, with considerable probability, to be of older date than the formation of the human race.

Another important branch of the physical history of the globe belongs to zoology; I mean, the nature, origin, and progress of the banks, reefs, and rocks of coral, and even the islands, which are perpetually arising and accumulating in the intertropical seas. These vast masses of calcareous matter are aggregated by the slow but incessant operations of countless millions of minute beings, so small, and so simply organized, that they occupy the lowest rank of animal existence, and indeed have been recognized only in late times as falling within the boundaries of the animal kingdom. Their works commence in the fathomless depth of the ocean; they rise towards the surface, forming sunken rocks, dangerous and often fatal to navigators; they reach the level of the water, and then extend in length and breadth. When we see that banks are formed of miles in extent, that coasts are obstructed, harbors choked, and even new islands formed, the mind is confounded by the contrast between the insignificance of the agents and the magnitude of the result.

Other points of view, and other applications of zoology, will be disclosed as we proceed. More perhaps has been already said than was necessary to convince an enlightened audience that the living part of nature's works is highly worthy of attention; and that this study, connected as it is with so many useful, interesting, and important departments of knowledge, must be deemed an essential branch of liberal education.

To these considerations, which recommend zoology, not only as a highly interesting, but essential branch of general knowledge, many others may be added, enforcing the cultivation of comparative anatomy and physiology more particularly on those who devote themselves to the improvement of medicine. The basis of our physiological principles is rendered broader and deeper, in proportion as our survey of living beings is more extensive. The varieties of organization supply, in the investigation of each function, the most important aids of analogy, comparison, contrast, and various combination; and the nature of the process receives at each step, fresh elucidation. These enlarged views, which unfold to us the natural play of the animal mechanism, are our surest guide in the study of its deranged motions, an essential criterion for estimating the nature and degree of the deviation, and an important indication of the means by which it may be corrected. Thus general anatomy and physiology furnish the principles by which we are guided in our attempts to preserve health, to alleviate and remove disorder. and cure disease. On such researches and such studies, on a foundation no less extensive than the whole empire of living nature, the science of medicine must be established; if, indeed, it be destined to occupy the rank of a science; if its practical precepts, its curative efforts, and its technical proceedings be grounded in and derived from a knowledge of the corporeal mechanism, and a contemplation of its mode of action, from observations of its deranged state, and of the course and order by which the return to health may be safely accomplished;—if, in short, it shall be permanently raised above its early state, of an empirical and blind belief in the virtues of herbs, drugs, and plasters; or above its more modern but equally deplorable condition, of servile submission to the dogmas of schools and sects, or subjection to doctrines, parties, or authorities. I appeal to the illustrious Founder of our Collection,—to his labors and his writings;—to that change in the state of surgery, which his exertions and his example have accomplished. Such achievements by a single hand hold out to us the brightest prospects, and most encouraging anticipations of the ample harvest awaiting the united efforts of more numerous cultivators. From this quarter we must expect the future improvement of our profession;—not from the addition of new medicines, to a catalogue already too long; not from fresh accessions to that mass of clinical observations, which lie unread on the shelves of our medical libraries.

In investigating the nature of living beings, various objects of inquiry present themselves, and various modes of proceeding may be adopted. We may examine their structure,—the number, form, size, relative position, and connexions of the organs, by the assemblage of which they are constructed;—their texture; that is, the primary animal tissues which compose the various organs, and their mode of union;—their elementary composition: or the number, nature, and combinations of the elements into which they can be resolved:—lastly, their living phenomena; the vital properties, with which all the primary tissues are endowed, the offices or functions executed by the organs, and the mutual influences and diversified dependencies which, regulating the order and succession of these living operations, combine so many partial and subordinate motions into one beautiful and harmonious whole.

It is the business of the anatomist to demonstrate the structure and unravel the texture of animal bodies: their composition falls within the department of the chemist; and their vital phenomena occupy the labors of the physiologist. Anatomy, therefore, teaches us the organization of animals; while physiology unfolds the nature of life. The third division forms a kind of border territory, lying between the domains of chemistry and physiology, alternately occupied and cultivated by both. Under the name of animal chemistry, it has received, of late years, a constantly increasing share of attention, and produced important accessions to our knowledge of the composition and operations of animal bodies.

This branch of inquiry is much less advanced than that which concerns their structure; and its progress is impeded by some peculiar difficulties. The primary textures are so intimately blended in all organs, that their complete separation seems impossible. The cerebral and nervous medulla is everywhere interwoven and surrounded by cellular substance and vessels; the muscular fibre, with cellular substance, vessels, nerves and fat: the cellular substance itself, with vessels and fat. Hence arise doubts how far the results of experiment are to be attributed to one or the other ingredient; so that we can seldom attain certainty, but must rest contented with probability. In many cases we do not even know the primary tissues. Are the stout sides of the uterus, or the beautiful and delicate moveable curtain of the iris, cellular or muscular; or does each contain some peculiar and not yet ascertained tissue? In a great number of living beings, our senses are not even able to settle the question. Who can decide whether the soft, tender, and almost deliquescent body of the polype is made up of muscular fibres, or of cellular tissue?

By etymology and original acceptation, physiology means doctrine of nature, and is not very appropriately applied to that limited division of natural science, which has for its object the various forms and phenomena of life, the conditions and laws under which this state exists, and the causes which are active in producing and maintaining it. A foreign writer* has proposed the more accurate term of "biology," or science of life.

Life, using the word in its popular and general sense, which at the same time is the only rational and intelligible one, is merely the active state of the animal structure. It includes the notions of sensation, motion, and those ordinary attributes of living beings which are obvious to common observation. It denotes what is apparent to our senses; and cannot be applied to the offspring of metaphysical subtlety, or immaterial abstractions, without a complete departure from its original acceptation,—without obscuring and confusing what is otherwise clear and intelligible.

The close connexion between life and respiration has not escaped the notice of ordinary observers,—of those who were ignorant of anatomy and physiology. Hence the breath has been popularly deemed the mark of life. The Latin *anima*, or 'breath,' (from the Greek *anemos*, 'wind') was also used to express the vital principle; essence of life being supposed identical with the breath. But in the phrases, 'animam efflare,' 'exspirare,' &c. the word seems to be used in its original sense. In the same way, the Latin *spiritus*, or original of our spirit, from *spiro* 'to breathe,' means merely 'breath:' the same is the case with the Greek *Pneuma:* and this is the original sensible object out of which all the abstractions and fancies, all the verbal sophistry and metaphysical puzzles, about spirit, have proceeded.

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* G. R. TREVIRANUS of Bremen, whose *Biologie oder Philosophie der Lebenden Natur für Naturforscher und Aerzte*, in 5 vols. 8vo. but not yet finished, is a very interesting work, both for the philosophic plan on which it is founded, and the original views with which it abounds.

Anatomy and physiology should be cultivated together: we should combine observation of the function with examination of the organization. The subjects are often distinctly treated in books: let not, however, this unnatural separation lead you into the error of viewing the vital manifestations as something independent of the organization in which they occur. Bear in mind that every organ has its living phenomena and its use, and that the chief ultimate object, even of anatomy, is to learn the nature of the function:—on the other hand, that every action of a living being must have its organic apparatus. There is no digestion without an alimentary cavity; no biliary secretion without some kind of liver; no thought without a brain.

To talk of life as independent of an animal body,—to speak of a function without reference to an appropriate organ,—is physiologically absurd. It is in opposition to the evidence of our senses and rational faculties: it is looking for an effect without a cause. We might as reasonably expect daylight while the sun is below the horizon. What should we think of abstracting elasticity, cohesion, gravity, and bestowing on them a separate existence from the bodies in which those properties are seen?

Haller, the father and founder of modern physiology, has furnished us the best example, both for the method of cultivating the subject, and of treating it in writing. He had devoted thirty years to the dissection of human bodies and those of animals, and to observation and to every variety of experimental research, before he began to compose his *Elementa Physiologiæ*. In this matchless work, a full anatomical description of every organ, drawn from his own dissections, precedes the history of its functions. I know no anatomical descriptions superior to these; none deserving of more implicit confidence. To regard this work as a mere register of opinions has always appeared to me very unjust: it contains new and accurate information on almost every part of the subject. It is no slight proof of its merits, that, although published in the middle of the last century, it remains the book of authority; and particularly in this country, which is still destitute of original standard works in anatomy and physiology.

In impressing upon your minds the close connexion of anatomy and physiology, I do not mean to represent to you that the forme teaches the latter. Strictly speaking, structure alone is learned by dissection: the vital properties of organic textures, and the functions of organs, are found out by observation. We have the most perfect anatomical knowledge of the spleen, thymus, and thyroid gland; but their offices in the animal economy are wholly unknown. What organ has been more carefully dissected and studied than the brain ? yet the respective offices of its various portions have not been discovered.

Anatomy, however, unfolds facts, of which the knowledge is absolutely necessary in appreciating the results of observation. It affords the only clue capable of guiding us through the multiplied and varied movements all going on together in the living microcosm, and of thus enabling us to discriminate the proper share of each organic apparatus. What kind of knowledge could the most patient and acute observer gain of the circulation if he knew nothing about the structure of the heart, lungs, arteries, and veins ? what insight could he acquire into the changes of the food, and the nutrition of our bodies, if the alimentary canal, with its divisions and appendages, and the absorbing vessels, were unknown to him ? Just notions of the seat and nature of the diseases, and of the operation of remedies, would be out of the question; but what chance has a person, ignorant of the general construction of our frame, of escaping from the most absurd doctrines and systems, and from the most pernicious practical errors ?

Anatomy, again, clears up doubtful points, and suggests topics of inquiry: it is a test and criterion of physiological explanations. If the latter are inconsistent with the anatomical facts, they must be rejected.

That its aid is essential to physiology may be proved by referring to what even the most acute men have written about the animal economy, before anatomy had been cultivated. It is a mass of error and fiction, without the smallest pretence to the title of physiology.

Anatomy and physiology are the ground work of pathology, or the science of disease.

Disease is a relative term, implying a comparison with a state of health, and presupposing a knowledge of that state. To anatomy, or science of healthy structure, is opposed morbid anatomy, or science of diseased structure: to physiology, or doctrine of healthy functions,—pathology, or doctrine of diseased manifestations. Morbid anatomy shows us the diseases; pathology, their external signs or symptoms. Often, no change of structure is observable; the deviations from the healthy condition elude our means of inquiry. The organ is said to be functionally disordered.

Thus we find that anatomy, physiology, morbid anatomy and pathology, are mutually related and intimately connected. Although called separate sciences, they are, in truth, parts of one system; and we must never lose sight of their mutual bearings. On the foundation of these four departments of knowledge or science is raised the practice of medicine, or the healing art; overlooking the artificial distinctions of physic, surgery, and so forth.

But is all this knowledge necessary for a practitioner? Is it required that a physician or a surgeon should know anatomy, natural and morbid, physiology, pathology? To the science of medicine, and to its rational improvement and extension, it is necessary; but by no means so to the mere routine of practice, and the very successful prosecution of the trade. Perhaps, indeed, a firm faith in drugs and plasters, and a liberal administration of them, may be the surer road to popular success, if the remark addressed by a veteran practitioner to a young enthusiast in science be well grounded: "Juvenis, tua doctrina non promittit opes; plebs amat remedia."

A common sailor uses his glass without knowing the laws of optics, or even suspecting their existence. But, would GALILEO have invented the telescope, and have given to mankind the power of penetrating into space, if he had been equally ignorant,—if he had been unacquainted with the action of various media, and of variously-shaped surfaces on the rays of light? An ordinary workman, of education and habits purely mechanical, constructs the most powerful astronomical instruments; but it belongs only to a HERSCHEL or a LA PLACE to improve these means, and to employ them so as to unfold the structure of the universe, and expound the laws which govern the motions of the heavenly bodies.

The collection of this College was formed, and is now arranged, in conformity to the views just alluded to. The anatomical preparations, exhibit the organs in the manner best calculated to elucidate their functions. To the rich and valuable series of healthy parts, there is added a parallel and equally extensive arrangement of morbid specimens.

Mr. HUNTER was the first in this country who investigated disease in a strictly philosophic method: bringing to bear on it the clear and steady lights of anatomy and physiology. He began by discarding all the doctrines of the schools, and resorted at once to nature. Instead of creeping timidly along the coast of truth, within sight of precedent and authority, he boldly launched into the great ocean of discovery, steering by the polar star of observation, and trusting to the guidance of his own genius.

His claim to the gratitude of English surgeons will be sufficiently established, by comparing surgical science before his time with its present state; and by contrasting, at the two periods, the relative rank of surgeons in public estimation. It would be foreign to my present purpose to pursue this topic: I shall therefore merely entreat you to bear it in mind: and to remember, that the true dignity of the profession, in which every individual member is a sharer, will be best promoted, not by partial privileges and arbitrary exclusions, not by any thing which royal charters or legal enactments can bestow or withhold, but by that scientific cultivation and honorable practice which constitute the only just claim to public esteem and confidence. It would be unnecessary for me to enter into further detail on a matter which has been already brought before you, with such forcible appeal to the best feelings of our nature, such display of elevated and honorable sentiments, and such felicity of expression, by my ingenious, eloquent, and worthy colleague.*

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* ANT CARLISLE, Esq.

LECTURE III.

On the Study of Physiology.—The Aids and Illustrations to be derived from other Sciences; as, Natural Philosophy, Mathematics, Chemistry.—Study of the Physical Sciences recommended.—Peculiar Character of the Vital Phenomena—Living Properties—Attempted Hypothetical Explanations of them.—Comparative Anatomy—its Objects—its Relations to Physiology exemplified.

DISSECTION, and the various auxiliary processes employed by the anatomist, are the only means of learning the structure of living beings;—observation and experiment, the only sources of our knowledge of life. These are the tests, or criteria, on which we must depend, and to which we must always refer. No position respecting structure can be listened to, unless it admits of verification by appeal to anatomy: no physiological statement deserves attention, unless it be confirmed by observation.

Is this then all? Are the labors of so many celebrated men, the accumulated harvests of so many centuries, reduced to the mere results of dissection and observation? It is so, in respect to real knowledge; and it will be occupation enough to anatomists and physiologists, for many ages, to cultivate these pursuits. The multitude and variety of organs in the human body, the complexity of their structure, the modifications incidental to each, and their mutual influences, offer a most extensive field of investigation; requiring so much time and assiduity, so much caution and discrimination, that the qualities necessary to a successful pursuit of physiology cannot be often combined in one individual.

When to man we add all the living beings which fill every department of nature, and consider the diversities and new combinations by which they are enabled to fulfil their various destinies, it will be hardly figurative to say that the objects of inquiry are infinite and inexhaustible.

In this, as in most other subjects, the quantity of solid instruction is an inconsiderable fraction of the accumulated mass;—a few grains of wheat are buried and lost amid heaps of chaff. For a few well-observed facts, rational deductions, and cautious generalizations, we have whole clouds of systems and doctrines, of speculations and fancies, built merely on the workings of the imagination and the labors of the closet.

In reference, however, to biology, or the science of life, I may observe, that descriptions of particular animals, and surveys of detached districts in the great kingdom of nature, are not so much wanted at present, as the assemblage and assortment of the facts already accumulated, and the employment of them by some vigorous and comprehensive mind to furnish the fundamental principles of the science of living nature. It is employment, and not mere possession, that gives a value to intellectual as well as material wealth. We have had workmen enough to toil in the mine and the quarry: they have raised and roughly fashioned an abundance of materials; and we now only wait for the architect who shall be able to employ them in constructing a temple, suitable in majesty and simplicity, to the Divinity whose shrine it is destined to contain.

The parts of natural history having been cultivated in a detached manner, its doctrines were long in an insulated state; unconnected to each other, like the pyramids in the deserts of Egypt: as the number of detached parts increased, the necessity of a system was felt to bind them together, however imperfectly, into something like a connected whole.

After many unsuccessful attempts by his predecessors, LINNEUS produced an arrangement of natural objects, which met with very general approbation and adoption. The efforts of naturalists were subsequently directed to the correction and extension of his system; to the formation of arrangements for detached parts, in imitation of that which he had framed for the whole; and in the description of new genera and species. These efforts have been continued to the present day, in a constantly increasing ratio; but, perhaps without a due consideration whether any results of proportionate utility to mankind were likely to reward so much pains and trouble. Some indeed, and among them LINNÆUS, were aware that all these artificial systems, without reference to higher objects, were almost lost labor; but they did not attempt to pursue those objects. The ultimate purpose of our researches in natural history is, to penetrate and lay open the secret springs by which the great system of organization, called 'NATURE,' is maintained in perpetual activity. Now, towards the accomplishment of this purpose, the artificial systems, on which so much labor has been bestowed, are hardly the first step. They do not exhibit the science, but an index or register of nature: which, indeed, has its recommendations of utility in other respects. The assemblage of the numerous facts which are scattered through the works of naturalists, and their combination into a whole, with reference to the purpose just mentioned, and with a view to establishing the laws of life, would possess a much higher value than all the descriptions of new animals and plants, which teach us little more than that they have such or such appearances, and that they occur in this or that corner of the earth.

If the science of life, and with it some of the most important departments of human knowledge, be destined to make any decided progress towards perfection, it must be by the road of experience, aided and enlightened by general philosophy. The way indeed, is in some parts difficult, and its length indefinite: but, whether we reach the end or not, our very efforts, and the active state of mind they maintain, will be a sufficient recompense; as the pleasure of the chase, and the healthy vigor it imparts, reward us, even when the game escapes.

"The intellectual worth and dignity of man are measured, not by the truth which he possesses, or fancies that he possesses, but by the sincere and honest pains he has taken to discover truth. This it is that invigorates his mind, and, by exercising the mental springs, preserves them in full activity. Possession makes us quiet, indolent, proud. If the Deity held in his right hand all truth,—and in his left only the ever-active impulse, the fond desire, and longing after truth, coupled with the condition of constantly erring, and should offer me the choice; I should humbly turn towards the left, and say, 'Father give me this: pure truth is fit for thee alone.[*]'" Thus spoke a sage; and his determination seems as wise as the famous choice of HERCULES.

In commencing the study of physiology, we are first led to inquire, whether living beings are subject to the same laws as inorganic bodies; whether the vital processes can be explained on the same principles as the other phenomena of matter; whether in short, the elucidations of the physical sciences are equally applicable to the science of life. That animals obey those general laws which regulate matter and motion in all other cases; that all their parts, as well as their entire masses, are subject to the influences of gravity, impulse, and the like, is too obvious to be a subject of question. The point of inquiry is, whether the internal movements of the animal machine are explicable by the laws of mechanics and hydraulics; whether, like these, they can be subjected to calculation; whether the changes of composition, incessantly going on in all parts of the frame, can be assimilated to the operations of our laboratories, or reduced to the laws of external chemistry; whether any living phenomena can be so far likened to those of electricity, galvanism, magnetism, as to justify us in referring for their explanation to the same principles.

In the beginning of the last century, the leading authorities in physiology, of whom BOERHAAVE may be mentioned as the head, supposed that all the functions of the living body, except the will, are carried on by mechanical movements, susceptible of rigid calculation, necessarily succeeding each other in the organs from the time that life commences. These movements he referred to an impulsive power in the heart, renewed by the influence of the nervous fluid brought from the brain. In this explanation the body is an hydraulic machine, in which the heart performs the office of a piston; the beautiful construction and endless variety of the animal organization are reduced to an assemblage of pipes, canals, levers, pulleys, and other mechanism. The treatises on physiology, of this period, were filled with mathematical problems, long calculations, and algebraic formulæ.

This system maintained its ground for a long time, in defiance of observation and common sense. In palliation of what strikes us now as so extravagantly erroneous, it must be observed, that many things in the animal economy admit of explanation on these principles. The structure and motions of the joints are purely mechanical; and the degree of effect produced by the muscles of a limb, like the acting force of a moving power applied to a common lever, depends entirely on the relative situation of their tendinous insertions to the centre of motion, and the relation which the course of their fibres bears to the axis of the moving bone. All these things may be as exactly determined by calculation as the operation of common levers; but the contraction of the living fibre, or original moving force, cannot be submitted to calculation,—cannot be in the slightest degree elucidated by mechanics.

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[*] TREVIRANUS, *Biologie*; b. I.

The valves of the heart and blood-vessels act mechanically; and operate as well in the dead as in the living body. The swelling of the veins of the lower limbs in the erect posture, and the turgescence of the same vessels in the head and neck, when they are held in a dependent attitude, will convince us, that, although the blood flows through living canals, its motion is not withdrawn from the all-pervading influence of gravity.

The transparent parts of the eye act on the rays of light according to the common laws of optics: and bring them to a focus, so as to form an inverted picture of the object on the retina, just as well in the dead as in the living organ, provided their transparency be unimpaired.

The operation, however, of those natural laws, to which living as well as all other bodies are subject, is constantly modified in the former case, by the vital powers; and this essential element in all mathematico-physiological considerations, is by its very nature, fluctuating and indeterminate. Uncertainty in the conditions of a problem, whether in respect to their entire number, or to the quantity of each, is an original sin, for which no subsequent accuracy can atone; and this character, belonging to all the circumstances of almost every case in the animal economy, not only effectually precludes all useful application of mathematics to physiology, but renders their employment a source of nothing but error and confusion. We can very seldom satisfy ourselves that all the data are before us; and the precise amount of each cannot be determined in any instance: nay more, variation and fluctuation are essential characters of all vital processes. The totally inconsistent results, at which different mathematical physiologists have arrived, in treating of the same functions, show us that very little useful service can be looked for from this quarter. One estimated the force of the heart as equal to 180,000 lbs.; another reduced it to 8 oz.; and both these conclusions are deduced from reasonings clothed in all the imposing forms of the exact sciences.

The circulation, in which a central impelling machine drives the blood through an arrangement of tubes, seems naturally to fall under the laws of hydraulics; and the course of the blood in its living channels, no doubt obeys the same laws that govern the transmission of fluids through inanimate canals. But, if we attempt to submit this intricate process to calculation, we are stopped at the very outset, by discovering, that, of its numerous conditions, not one is ascertained with sufficient accuracy for our purpose. It would be necessary to know the amount of nervous influence on the heart and blood-vessels, the measure of active and passive power in the former organ, the quantity of blood arriving at and departing from it, the elastic and other properties of the vessels, their various capacities, the resistance of the column in the arteries and veins, the density and cohesion of the blood, and many other points—and to know all these with perfect accuracy. Even if all this were accomplished, the great number of elements entering into such a theory would conduct us to impracticable calculations: it would be the most complex case of a problem which is extremely difficult of solution in its simple state. The ablest geometricians, sensible of these difficulties, speak of the operations of living bodies with a modest caution, to which the bold calculations of some physiologists form a striking contrast. They acknowledge that the springs of the animal frame are too numerous, too intricate, and too imperfectly known, to be submitted, with any prospect of advantage, to calculation; that, in such complicated operations, experience is our only safe guide, and inductions from numerous facts the only sure support of our reasonings. The most just calculations on such subjects can merely appreciate our ignorance; which may indeed be concealed, but cannot be removed by the vain parade of a science foreign to medicine.

If we define chemistry as the science which teaches us the composition of bodies, explaining the laws according to which their elementary particles act on each other when brought into contact, the combinations or separations which result from their affinities, and the circumstances which promote or obstruct the action of those affinities, we must allow that many of the animal processes exhibit to us chemical operations. Such are the changes wrought upon the food by the solvent juices of the stomach, and by the admixture of bile, pancreatic liquor, and intestinal secretions; the new combinations, which the elements of the blood enter into in the glands, the membranes, and the skin, and in the texture of the various organs, so as to exhibit to us a new set of products; the conversion of chyle and lymph into blood; and the mutual action of this fluid and the atmosphere in respiration.

Chemical researches into the composition of the fluids and solids of the animal frame, and comparative examinations of them under the differences of age, sex, climate, food, mode of life and the various incidences of disease, have thrown great light both on the healthy and disordered actions of our frame; particularly those inquiries which have been conducted with the advantages of the modern improvements in chemical science. Further benefit is to be expected from a continuance of these exertions; and we can have no hesitation in admitting that many important points in physiology cannot be understood, the nature and result of many animal processes cannot be appreciated, by a person unacquainted with chemistry.

Nor is the benefit confined to physiology: the kindred sciences, which have for their object the knowledge of disease, its prevention and cure, owe great and important obligations to modern chemistry. By unfolding the composition, and separating the various ingredients contained in an apparently homogeneous fluid, the urine, it has enabled us to form some conception of the important purposes executed by the kidney. By showing the deviations which this animal fluid exhibits in various conditions of disease, it has elucidated the mechanism of many disordered actions; and, by discovering what particular ingredients existed in undue proportion, it has suggested the means of relief by the internal administration of suitable chemical remedies. Thus the modern views respecting the nature, and treatment of calculous disorders are completely chemical; and modern experience fully substantiates the important truth that alkalies and acids taken into the stomach affect the chemical constitution of the urinary secretion. But these views do not terminate here: the condition of the urine is an index of what is going forward in the alimentary canal, an outward and visible sign of the inward and hidden movements of the stomach, bowels, and other parts. These again are variously modified by the nature and quality of our food and drink, by the operation of our remedies, and by those obscure and mysterious, but incontestible influences of other parts, which are usually denominated sympathies. Thus, as the successive undulations of water spread wider and wider as they recede from the point first agitated, our chemical examination of a single excretion, by virtue of the mutual influences which bind together all parts of our system, expands at last to considerations embracing the whole economy.

For the theory of diabetes we are principally indebted to chemistry: and we ought not to omit acknowledging the debt, because its amount has not been increased by the suggestion of an adequate remedy.

With these strong facts before our eyes, and with the knowledge that Nature, however sportively various in unessential details, is generally uniform in the leading principles of the means by which she accomplishes similar purposes, may we not reasonably expect that the action of many remedies will be traced hereafter to chemical influence? May we not hope that the dark corner of our science, the *modus operandi* of its remedial administrations, will receive light from this quarter?

It is, however, in most cases, the result, and not the operation itself, that we learn from chemistry. By comparing the blood and the urine, we estimate the office of the kidney; but we know just as little as we did before of that wonderful and mysterious process, by which the capillaries of the gland transform blood into urine: and when we see the capillaries of other parts convert this same blood into twenty other fluids or solids, we feel still more forcibly the striking contrast between these and the operations commonly called chemical, and the insufficiency of explanations grounded merely on the analogies of the latter changes. If a gland, a membrane, a muscle, or a bone, in their operations of secretion and nutrition, be chemical instruments, their analogy to those employed in our laboratories is so remote, as to be hardly perceptible.

Of the attempts at explaining the sentient and contractile operations of the nerves and muscles by chemical agencies, or at resolving life in general into a mere play of chemical affinities, I can only say that they appear to me injudicious. The ablest chemists, those who are most deeply versed in the operations, means, various applications, and extent of their science, are extremely cautious in applying it to the explanation of vital processes. One of the most striking phenomena of living bodies is the exception which they offer to the laws of chemistry. Composed of matters extremely prone to decomposition, and surrounded by all the influences of heat, air, and moisture, which are very favorable to such change, they yet remain unaltered.

Living bodies, as well as all dead ones, exhibit electrical phenomena under certain circumstances: but the contrast between the animal functions and electric operations is so obvious and forcible, that the attempts to assimilate them do not demand further notice.

By the preceding observations, or by any subsequent ones, I would by no means discourage surgical students from the pursuit of the physical sciences. I regard them, on the contrary, not merely as a desirable ornamental accompaniment, but as powerful and indispensable auxiliaries in physiological and medical researches. A close alliance between the science of living nature and physics and chemistry, cannot fail to be mutually advantageous. What we have principally to guard against, in our professional researches and studies, is the influence of partial and confined views, and of those favorite notions and speculations, which, like colored glass, distort all things seen through their medium. Thus we have had a chemical sect, which could discern, in the beautifully-varied appointments and nice adaptations of animal structure, nothing but an assemblage of chemical instruments;—a medico-mathematical doctrine, which explained all the phenomena of life by the sciences of number and magnitude—by algebra, geometry, mechanics, and hydraulics: and even a tribe of animists, who, finding that all the powers of inorganic nature had been invoked in vain, resorted to the world of spirits, and maintained that the soul is the only cause of life. It is amusing to observe the entire conviction and self-complacency with which such systems are brought forward. The parable of Nathan the Wise is not confined in its application to matters of theological faith,—to the ardor with which wrangling sectaries dispute about their petty divisions and subdivisions of belief: each medical sect conceives itself in possession of the true ring; yet probably they are all more or less counterfeit.

If the seductive influence of favorite notions, and the disproportionate importance attached to particular sciences, have operated so unfavorably on the doctrines of physiology and medicine, the remedy for the evil must be sought in more enlarged views and general knowledge. We cannot expect to discover the true relations of things, until we rise high enough to survey the whole field of science, to observe the connexions of the various parts and their mutual influence.

Besides the direct utility of the physical sciences in explaining many parts of the animal economy, they serve a collateral purpose, which recommends them strongly to the medical student. They have their foundation in experiment, as physiology and medicine have in observation; the only difference being, that in the latter case we are obliged to take our subjects in all the complexity of their natural composition, while in the former it is in our power to regulate the conditions of the operation, and to reduce them, by successive analyses, to the greatest simplicity. The subsequent proceedings of physical science are governed by strict method, and guarded against error by the severe rules of inductive logic. The constant vigilance of these incorruptible sentinels protects the sanctuary from the incursions of extra-physical or metaphysical chimeras, and from the intrusion of immaterial agencies. Strengthened by this salutary discipline, and accustomed to close reasoning, the mind is well prepared for the study of living nature, clothed with a defensive armor, on which verbal and metaphysical puzzles, and the misplaced exertions of the imagination, will make no impression.

Now, although certain parts of the animal economy obey the laws of mechanics, and others admit of illustration by the aid of chemistry, and thus far the living processes come within the domain of the physical sciences, the main springs of the animal functions, the original moving forces, cannot be explained on these grounds. The powers of sensation and contraction, and the properties of the capillary vessels, belong peculiarly and exclusively to living organic textures: they are eminently vital, and form the distinguishing character of living beings. We learn them by observation, as we learn the properties of dead matter; and we know nothing more than the fact, that certain vital manifestations are connected with certain organic structures.*

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* Since I delivered these Lectures, I have become acquainted with Dr. BROWN's *Inquiry into the Relation of Cause and Effect*, third edition, 8vo. Edinburgh, 1818; a most instructive work, calculated to dispel much of the obscurity and confusion by which both physical and metaphysical discussions have been perplexed and retarded, and to interest strongly all those who derive pleasure from perspicuous language and close reasoning. As it is extremely important to possess clear notions of causation, of the relations expressed by the words *cause*, *effect*, *property*, *quality*, *power*, I subjoin an extract, in which these matters are more satisfactorily explained than in any other book I have met with.

"It is this mere relation of uniform antecedence, so important and so universally believed, which appears to me to constitute *all* that can be philosophically meant, in the words *power* or *causation*, to whatever objects, material or spiritual, the words may be applied. If events had succeeded each other in perfect irregularity, such terms never would have been invented; but, when the successions are believed to be in regular order, the importance of this regularity to all our wishes, and plans, and actions, has of course led to the employment of terms significant of the most valuable distinctions which we are physically able to make. We give the name of *cause* to the object which we believe to be the invariable antecedent of a particular change; we give the name of *effect*, reciprocally, to that invariable consequent; and the relation itself, when considered abstractedly, we denominate *power* in the object that is the invariable antecedent—*susceptibility*, in the object that exhibits, in its change, the invariable consequent. We say of fire, that it has the *power* of melting metals; and of metals, that they are *susceptible* of fusion by fire.—that fire is the *cause* of the fusion, and the fusion the *effect* of the application of fire: but, in all this variety of words, we mean nothing more than our belief, that when a solid metal is subjected for a certain time to the application of a strong heat, it will begin afterwards to exist in that different state which is termed liquidity,—that, in all past time, in the same circumstances, it would

The only reason we have for asserting in any case that any property belongs to any substance, is the certainty or universality with which we find the substance and the property in question ac-

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have exhibited the same change,—and that it will continue to do so, in the same circumstances, in all future time. We speak of two appearances which metals present; one before the application of fire, and the other after it: and a simple but universal relation of heat and the metallic substances, with respect to these two appearances, is all that is expressed.

"A CAUSE, therefore, in the fullest definition which it philosophically admits, may be said to be, THAT WHICH IMMEDIATELY PRECEDES ANY CHANGE, AND WHICH, EXISTING AT ANY TIME IN SIMILAR CIRCUMSTANCES, HAS BEEN ALWAYS, AND WILL BE ALWAYS, IMMEDIATELY FOLLOWED BY A SIMILAR CHANGE. Priority in the sequence observed, and invariableness of antecedence in the past and future sequences supposed, are the elements, and the only elements, combined in the notion of a cause. By a conversion of terms, we obtain a definition of the correlative *effect;* and *power*, as I have before said, is only another word for expressing abstractly and briefly the antecedence itself, and the invariableness of the relation.

"The words *property* and *quality* admit of exactly the same definition; expressing only a certain relation of invariable antecedence and consequence, in changes, that take place, on the presence of the substance to which they are ascribed. They are strictly synonymous with *power;* or, at least, the only difference is, that *property* and *quality*, as commonly used, comprehend both the *powers* and *susceptibilities* of substances,—the powers of producing changes, and the susceptibilities of being changed. We say equally, that it is a property or quality of water to melt salt, and that it is one of its qualities or properties to freeze or become solid on the subtraction of a certain quantity of heat; but we do not commonly use the word *power* in the latter of these cases, and say that water has the power of being frozen."—"*Power*, *property*, and *quality*, are, in the physical use of these terms, exactly synonymous. Water has the *power* of melting salt;—it is a *property* of water to melt salt;—it is a *quality* of water to melt salt:—all these varieties of expression signify precisely the same thing,—that, when water is poured upon salt, the solid will take the form of a liquid, and its particles be diffused in continued combination through the mass. Two parts of a sequence of physical events are before our mind; the addition of water to salt, and the consequent liquefaction of what was before a crystalline solid. When we speak of all the powers of a body, we consider it as existing in a variety of circumstances; and consider, at the same time, all the changes that are, or may be, in these circumstances, its immediate effects. When we speak of all the qualities of a body, or all its properties, we mean nothing more, and we mean nothing less. Certain substances are conceived by us, and certain changes that take place in them, which we believe will be uniformly the same, as often as the substances of which we speak exist in circumstances that are exactly the same.

companying each other. Thus we say that gold is yellow, ductile, soluble in nitro-muriatic acid, because we have always found gold, when pure, to be so. We assert that living muscular fibres are irritable, living nervous fibres sensible, for the same reason. The evidence of the two propositions presents itself to my mind as unmarked by the faintest shade of difference.

Having found by experience that every thing we see has some cause of existence, we are induced to ascribe the constant concomitance of a substance and its properties to some necessary connexion between them: but, however strong the feeling may be, which leads us to believe in some more close bond, we can only trace, in this notion of necessary connexion, the fact of certainty or universality of concurrence. Nothing more than this can be meant, when a necessary connexion is asserted between the properties of sensibility and irritability, and the structures of living muscular and nervous fibres.

This language does not explain how the thing takes place; it is merely a mode of stating the fact. To say that irritability is a property of living muscular fibres, is merely equivalent to the assertion, that such fibres have in all cases possessed the power of contraction. What then is the cause of irritability? I do not know, and cannot conjecture.

In physiology, as in the physical sciences, we quickly reach the boundaries of knowledge whenever we attempt to penetrate

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"The powers, properties, or qualities of a substance are not to be regarded, then, as any thing superadded to the substance, or distinct from it. They are only the substance itself, considered in relation to various changes, that take place, when it exists in peculiar circumstances."

We cannot be surprised that the author of the *Physiological Lectures* should have poured forth the full vials of his wrath on doctrines at once completely subverting all his airy structures of subtle fluids, mobile matters, &c. &c. considered as causes of vital actions, and so simple and logical, that any attempt at direct opposition by reasoning would be utterly hopeless. He therefore boldly affirms, that "if they mean to insinuate that we have no knowledge of cause or effect beyond that which results from mere observation, they publish at the same time a libel on the human understanding, a prohibition to rational inquiry, and a most severe satire on themselves." p. 91. Unless the author should show, on some future occasion, what he has not even attempted on the present,—viz. what it is that the words cause and effect denote, in addition to relative invariable antecedence and consequence,—this volley of hard words will only recoil on his own head.

the first causes of the phenomena. The most we can accomplish is, to make gradual conquests from the territories of ignorance and doubt; and to leave under their dominion those objects only which our reason has not reached, or is not able to reach. The great end of observation and experiment is to discover, among the various phenomena, those which are the most general. When these are well ascertained, they serve as principles, from which other facts may be deduced. The Newtonian theory of gravitation is a most splendid example. The only object of uncertainty which then remains, is the first cause of a small number of facts. The phenomena succeed each other, like the generations of men, in an order which we observe, but of which we can neither determine nor conceive the commencement. We follow the links of an endless chain; and, by holding fast to it, we may ascend from one link to another; but the point of suspension is not within the reach of our feeble powers.

To call life a property of organization would be unmeaning;—it would be nonsense. The primary or elementary animal structures are endued with vital properties; their combinations compose the animal organs, in which, by means of the vital properties of the component elementary structures, the animal functions are carried on. The state of the animal, in which the continuance of these processes is evidenced by obvious external signs, is called life.

The striking differences between living and inorganic bodies, and the strong contrast of their respective properties, naturally excited curiosity respecting the causes of this diversity, and endeavors to show the mode in which it was effected. Here we quit the path of observation, and wander into the regions of imagination and conjecture; it is the poetic ground of physiology; but the union is unnatural; and, like other unnatural unions, unproductive. The fiction spoils the science, and the admixture of science is fatal to inspiration. The fictitious beings of poetry are generally interesting in themselves, and are brought forward to answer some useful purpose; but the genii and spirits of physiology are awkward and clumsy, and do nothing at last which could not be accomplished just as well without them: they literally encumber us with their help.

For those, who think it impossible that the living organic structures should have vital properties without some intrinsic aid,—although they require no such assistance for the equally wonderful affinities of chemistry, for gravity, elasticity, or the other properties of matter,—a great variety of explanations, suited to all tastes and comprehensions, has been provided.

Some are contented with stating that the properties of life arise from a vital principle. This explanation has the merit of simplicity, whatever we may think of its profoundness; and it has the advantage of being transferable, and equally applicable to any other subject. Some hold, that an immaterial principle, and others, that a material, but invisible and very subtle agent, is superadded to the obvious structure of the body, and enables it to exhibit vital phenomena. The former explanation will be of use to those who are conversant with immaterial beings, and who understand how they are connected with and act on matter. But I know no description of persons likely to benefit by the latter: for subtle matter is still matter; and if this fine stuff can possess vital properties, surely they may reside in a fabric which differs only in being a little coarser.

Mr. HUNTER has a good substantial sort of living principle: he seems to have had no taste for immaterial agents, or for subtle matters. His *materia vitæ* is something tangible; he describes it as a substance like that of the brain, diffused all over the body, and entering into the composition of every part. He conceives even the blood to have its share.[*] We may smile at these fancies, without any disrespect to a name that we all revere, without any insensibility to the merits of a surgeon and physiologist whose genius and labors have reflected honor on our profession and our country. If the father of poetry sometimes falls asleep, a physiologist may be allowed to dream a little: but they who are awake, need not shut their eyes, and endeavor to follow his example,—need not exhibit another instance of the perverted taste which led the disciples of an ancient philosopher to drink spinach-juice, that they might look pale like their master.

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[*] That the author of the *Physiological Lectures* should have published two books, principally for the purpose of explaining, illustrating, and confirming Mr. HUNTER's "*Theory of Life*," without showing us in either, what that theory was, without a single citation or reference to identify this doctrine,—thus boldly baptized with the name of HUNTER,—as the literary offspring of its alleged parent, appears strange and suspicious. It is easily explained: for this *Hunterian* theory of life, which its real author so stoutly maintains to be not only probable and rational, but also verifiable, is no where to be found in the published writings of Mr. HUNTER; and does not even resemble the speculations on the same subject, which occur in the posthumous work on the *Blood, Inflammation, &c.* part i. chap. i. sec. 5. *on the Living Principle of the Blood*. In perusing the writings of Mr. HUNTER, we should always remember his unfortunate want of early education, the difficulty he felt in conveying his ne-

Plato made the vital principle to be an emanation of the *anima mundi*, or soul of the world; an explanation, no doubt, quite satisfactory to those who know what the soul of the world is, and how other souls emanate from it.

The Brahmins of the East hold a similar notion; but they make the soul after death pass on into other bodies, or into animals, according to its behaviour; admitting, however, that those of the good are immediately re-absorbed into the Divinity. Some of the Greeks adopted a distinct vital, sensitive, and rational principle in man.

These are merely specimens,—a few articles, as patterns, selected from a vast assortment. If you do not like either of them, there are plenty more to choose from. As these and a hundred other such hypotheses are all supported by equally good proof,—which is neither more nor less, in each instance, than the thorough conviction of the inventor; and as they are inconsistent with each other, and therefore mutually destructive; we need not trouble ourselves further, until their respective advocates can agree together in selecting some one for their patronage, and discarding the rest:—for of these, as of the numerous religions in the world, only one can be true.

What is comparative anatomy? The expression is rather vague and indefinite. You naturally inquire what is compared? what is the object of comparison? The structure of animals may be compared to that of man. To lay down the laws of the animal

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tions clearly by words, and the mutilation which his thoughts must have suffered in passing through the press, both from the causes just mentioned, and from the revision and correction to which some of his writings were subjected.

economy from facts furnished by the human subject only, would be like writing the natural history of our species from observing the inhabitants of a single town or village.

Repeated observations and multiplied experiments on the various tribes of animated nature have cleared up many obscure and doubtful phenomena in the economy of man. A continuation of this method will place physiology on the solid basis of experience, and build up science on ground hitherto occupied by fancy and conjecture.

The physiologist, who is conversant with natural history in general, is fortified against uncertain opinions, and the showy but flimsy textures of verbal sophistry. An hypothesis which to others appears perfectly adequate to the object in view, is not convincing to him: he rises above the particular object to which it is accommodated, in order to appreciate its value: as we ascend an eminence to gain a commanding view of a district, to distinguish its features, to ascertain the number and bearings of its parts, and their relations to the surrounding country.

There are three points of view, in which comparative anatomy has an important bearing on human physiology.

In the infancy of science, physiology, such as it was, owed its origin to zootomy, which was practised by physicians and naturalists eighteen centuries before human dissections began. The *Anatomia Partium Corporis Humani* of Mondini, written in the beginning of the fourteenth century, was the first compendium of human anatomy composed from actual dissection. It is easy to show that even the osteology of Galen was not drawn from the human skeleton: and many parts of the body still bear names derived from animals, which names are in some instances not correctly applicable to the human structure; for example, the epithets right and left as applied to the cavities of the heart.

Although human anatomy, after its first scientific developement by Berengar of Carpi, was so quickly brought to a high pitch of perfection by the great triumvirate, Vesalius, Fallopius, and Eustachius, yet the most important discoveries, those of greatest weight in physiology considered as the basis of medicine, were made in animals. No period has been so fruitful in these discoveries, nor so distinguished in the literary history of our science, as the seventeenth century; in which the anatomy of brutes was most zealously cultivated, and most of the great anatomical facts were found out, which, by unveiling the hidden springs and movements of the animal machine, have furnished the principles, upon which rational pathology and practical medicine have been established.

These comparative researches render the most important service, by affording a criterion, in doubtful cases, for determining the uses of parts, which, as the main object of this fundamental medical science, has been well chosen by Galen for the title of his classical work on physiology. Hence Haller observes, that the situation, figure, and size of parts ought to be learned from man; their uses and motions must be drawn from animals.

I shall adduce a few particulars, for the purpose of exemplifying the preceding remarks.

A serpent swallows an animal larger than itself, which fills its œsophagus as well as stomach, and of which the digestion occupies several days, or even weeks. We open the reptile during this process, and find that part of the animal which remained in the œsophagus, sound and natural; while the portion which had descended into the stomach, though still retaining its figure, is semi-liquefied, reduced into so soft a state as to break down under the slightest pressure. How effectually does this simple fact refute the notions of digestion being mechanical trituration: or solution by heat (for the animal is cold-blooded); or the effect of fermentation, or putrefaction, or coction!

The slow and languid motion of the blood in cold-blooded animals has enabled us to demonstrate in them the circulation, which in man can only be proved by argument.

Physiologists have been much perplexed to find out a common centre in the nervous system, in which all sensations may meet, and from which all acts of volition may emanate; a central apartment for the superintendent of the human *panopticon;* or, in its imposing Latin name, a *sensorium commune.* That there must be such a point they are well convinced, having satisfied themselves that the human mind is simple and indivisible, and therefore capable of dwelling only in one place. The pineal gland, the corpus callosum, the pons Varolii, and other parts, have been successively suggested. Now, there are many orders of animals with sensation and volition, which have none of these parts: and this assumed unity of the sentient principle becomes very doubtful, when we see other animals, possessed of nervous systems, which, after being cut in two, form again two perfect animals. Is the immaterial principle divided by the knife, as well as the body?

The heart has been regarded by many physiologists as the prime mover in the animal machine,—the origin of vital motion in the embryo, the chief agent in forming and maintaining the fabric, and the main-spring for keeping the whole machinery in action. There are whole classes of living beings, and some of complicated structure, which have no heart.

Some have regarded the spleen as a sponge, soaking up the blood when the stomach is empty, and allowing it to be squeezed out again by the pressure of this bag when distended. In many animals, the spleen is neither cellular, nor so situated as to be compressible by the stomach; this is the case, generally speaking, with birds and reptiles. The office of conveying away fluids from the stomach has been assigned to it; making it a kind of waste-pipe, to prevent the liquid contents of the digestive cistern from arising above a certain level. But it exists in reptiles and fishes, where neither the figure of the stomach, nor the known habits of the animals, in respect to food and digestion, admit of this explanation. In the camel, which retains the water in its stomach, and in the horse, where it passes very rapidly into the cæcum, the spleen is as large as in other animals. In beasts of prey, which hardly drink at all, it is as large and cellular as in the herbivorous ruminant animals. Its size and its cells are particularly conspicuous in the latter: yet the fluids which they swallow go into the paunch, and not into the true digestive stomach.

Although arguments from analogy are of great service in physiology and other departments of natural history, although they throw light on obscure points, and give an interest to many discussions, their employment requires caution, and they should rather be resorted to for illustration than relied on for direct proof. Organs corresponding in situation and name are not always constructed alike; hence a part is sometimes employed in one class of animals for a different purpose from that which the instrument of the same name and of analogous position in the body executes in another. The gizzards of the gallinæ have a prodigious triturating power; and those, who first ascertained by experiment the extent of their power, were disposed to infer that digestion is effected in man by mechanical attrition. Now the gizzard, although the corresponding part to our stomach, is, in structure and action, the instrument of mastication; and, as birds have no teeth, it is the only instrument for dividing the hard grain on which they feed. Further inquiry shows, that even in this stomach, which is covered by a thick insensible cuticle capable of bearing the friction of grain and siliceous pebbles, digestion is really effected, as in the stomach of man, by solution; the solvent juice being secreted by the large collection of glands at the cardiac end of the œsophagus, and having an operation similar to that of the gastric fluid of quadrupeds.

It has been argued, that the arteries of the mammalia must have a contractile power, because, in some worms without a heart, these vessels carry on the circulation alone. The whole economy is too different in the two instances to admit of inferences from analogy; the circulating apparatus, in particular, is formed on plans altogether different in the two cases; and the structure and actions of the vessels of worms are, in fact, very little known.

Because the vesiculæ seminales in some animals do not communicate with the vasa deferentia, and therefore cannot receive the fluid secreted in the testicles, it has been inferred that they do not serve the purpose of reservoirs for the seminal secretion in man; where, however, they have so free a communication with the vasa deferentia, that any fluids pass into and even distend the former, before they go on into the urethra. The organic arrangement is different in the two instances; and this difference leads us to expect a modification in the function, instead of authorizing us to infer that the same office is executed in exactly the same manner in both cases. If we met with animals in whom the cystic duct opened into the small intestines separately from the hepatic, shall we therefore infer that the human gall-bladder is not a receptacle for the hepatic bile?

Again: Animals may be compared to each other: each organ must be examined in all the gradations of living beings; its modifications compared and surveyed in relation to the varieties of other parts, before a just notion of its functions can be formed. This kind of examination of the animal kingdom leads to what may be called 'general anatomy,' the basis of general physiology; the objects of which are, to determine the organization, and unfold the vital laws of the whole system of living beings.

In the physical sciences, we have the power of insulating the various objects of our research; of analysing them into their component elements; of subtracting these successively; and thus determining beforehand all the conditions of the problem we may be studying. It would be desirable to employ the same proceeding in natural history; and it is resorted to, when the objects are sufficiently simple. But they are, for the most part, too complicated, and connected too closely by mutual influences. We cannot analyse an animal of the higher orders, and observe the simple result of each organ by itself; for, if we destroy one part, the motion of the whole machine is stopped. The phenomena come before us under conditions not regulated by our own choice; and in a state of complication, requiring close attention and careful discrimination, to search out and determine the precise share of each component part.

In this difficulty, comparative observations afford some assistance. The animals of inferior classes are so many subjects of experiment ready prepared for us: where any organ may be observed under every variety of simplicity and complication in its own structure,—of existence alone, or in combination with others.

LECTURE IV.

Nature of Life.—Methodical Arrangement of Living Beings—Species, Varieties, Genera, Orders, &c.—Progressive Simplification of Organization, and of Functions.—Intellectual Functions of the Brain, in the natural and disordered state, explained on the same principles as the offices of other Organs.

The notion of life is too complicated—embraces too many particulars—to admit of a short definition. It varies in the different kinds of animals, as their structure and functions vary; so that a description drawn from one would not be applicable to others differently situated in the animal series. If we include in the description those circumstances only which are common to the whole animal kingdom, we must direct our view to beings of the most simple structure, where the phenomenon is reduced to its essential features; and these are not obscured or confused by accessary circumstances.

The distinguishing characters of living beings will be found in their texture or organization; in their component elements; in their form; in their peculiar manifestations or phenomena; and in the limits, that is, in the origin and termination of their vital existence.

Their body is composed of solids and fluids; the former arranged in fibres and laminæ, so as to intercept spaces which are occupied by the latter. The solids give the form to the body, and are contractile. The fluids are generally in motion.

The component elements, of which nitrogen is a principal one, united in numbers of three, four, or more, easily pass into new combinations; and are, for the most part, readily convertible into fluid or gas.

Such a kind of composition, and such an arrangement of the constituent parts, is called organization; and, as the vital phenomena are only such motions as are consistent with these material arrangements, life, so far as our experience goes (and we have no other guide in these matters,) is necessarily connected with organization. Life presupposes organization, as the movements of a watch presuppose the wheels, levers, and other mechanism of the instrument.

The organization assumes certain definite forms in each kind of animals; not merely in the external arrangement of the whole, but in each part, and in all the details of each. On this depends the kind of motion which each part can exercise,—the share which it is capable of contributing to the general vital movement; which latter, or, in short, life, is the result of the mutual actions and re-actions of all parts.

Living bodies exhibit a constant internal motion, in which we observe an uninterrupted admission and assimilation of new, and a correspondent separation and expulsion of old particles. The form remains the same; the component particles are continually changing. While this motion lasts, the body is said to be alive;—when it has irrecoverably ceased, to be dead. The organic structure then yields to the chemical affinities of the surrounding agents, and is speedily destroyed.

All living beings have, in the first place, formed part of a body like their own; have been attached to a parent before the period of their independent existence. The new animal, while thus connected, is called a germ: its separation constitutes generation or birth. After this, it increases in size according to certain fixed laws for each species and each part.

The duration of existence is limited in all animals: after a longer or shorter period, the vital movements are arrested, and their cessation or death seems to occur as a necessary consequence of life.

Thus, then, absorption, assimilation, exhalation, generation, and growth, are functions common to all living beings: birth and death, the universal limits of their existence; a reticular contractile tissue, with fluids in its interstices, the general essence of their structure; substances easily convertible into the state of liquid or gas, and combinations readily changing, the basis of their chemical composition. Fixed forms, perpetuated by generation, distinguish their species, determine the combination of secondary functions peculiar to each, and assign to them their respective situations in the system of the universe.

After forming this general notion of living beings, we proceed to examine the animal kingdom in detail. The first glance discovers to us an infinite variety of forms; diversities so numerous, that the attempt to observe and register the whole seems almost hopeless. We find, however, that these forms at first view so infinitely various, admit of being classed together,—of being formed into groups, each of which is distinguished by certain essential characters. In the latter, all the animals comprehended in each group agree; while they differ from each other in particulars of minor importance.

I have already mentioned, that a fixed external form belongs to each animal, and that it is continued by generation. Certain forms, the same as those existing in the world at the present moment, have existed from time immemorial. Such, at least, is the result of the separate and combined proofs furnished by our own observation and experience respecting the laws of the animal kingdom, by the voice of tradition and of history, by the remains of antiquity, and by every kind of collateral evidence.

All the animals belonging to one of these forms constitute what zoologists call a SPECIES. This resemblance must not be understood in a rigorous sense; for every being has its individual characters, of size, figure, color, proportions. In this sense, the character of variety is stamped on all Nature's works. She has made it a fundamental law, that no two of her productions shall be exactly alike; and this law is invariably observed through the whole creation. Each tree, each flower, each leaf, exemplifies it; every animal has its individual character; each human being has something distinguishing, in form, proportions, countenance, gesture, voice,—in feelings, thought, and temper,—in mental as well as corporeal physiognomy. This variety is the source of every thing beautiful and interesting in the external world,—the foundation of the whole moral fabric of the universe.

I cannot help pointing out to you how strongly the voice of

Nature, so clearly expressed in this obvious law, opposes all attempts at making mankind act or think alike. Yet the legislators and rulers of the world have persisted, for centuries, in endeavoring to reduce the opinions, the belief of their subjects, to certain fancied standards of perfection,—to impress on human thoughts that dreary sameness, and dull monotony, which all the discipline and all the rigor of a religious sect have been hardly able to maintain in the outward garb of its followers. The mind however, cannot be drilled,—cannot be made to move at the word of command: it scorns all shackles; and rises with fresh energy from every new attempt to bind it down on this bed of PROCRUSTES.

All the oppression and persecution, all the bloodshed and misery, which the attempts to produce uniformity have occasioned, are, however, a less evil than the success of these mad efforts would be, were it possible for them to succeed in opposition to the natural constitution of the human mind—to the general scheme and plain design of Nature.

The most powerful monarch of modern history, who exhibited the rare example of a voluntary retreat from the cares of empire while still fully able to wield the sceptre, was rendered sensible of the extreme folly he had been guilty of, in attempting to produce uniformity of opinion among the numerous subjects of his extensive dominions, by finding himself unable to make even two watches go alike, although every part of this simple mechanism was constructed, formed, and adjusted by himself. The dear experience and the candid confession of CHARLES V. were thrown away on his bigoted son: who repeated on a still grander scale, with fresh horrors and cruelties, the bloody experiment of dragooning his subjects into uniformity, only to instruct the world by a still more memorable failure.

The increasing light of reason has destroyed many of these remnants of ignorance and barbarism: but much remains to be done, before the final accomplishment of the grand purpose, which, however delayed, cannot be ultimately defeated;—I mean, the complete emancipation of the mind: the destruction of all creeds and articles of faith; and the establishment of full freedom of opinion and belief. I cannot doubt that a day will arrive, when the attempts at enforcing uniformity of opinion will be deemed as irrational, and as little desirable, as to endeavor at producing sameness of face and stature.*

In the mean time, no efforts capable of accelerating a consummation so beneficial to mankind should be omitted; and I have therefore attempted to show you, that, on this point, the analogies of natural history accord with the dictates of reason and the invariable instructions of experience.

Certain external circumstances, as food, climate, mode of life, have the power of modifying the animal organization, so as to make it deviate from that of the parent. But this effect terminates in the individual. Thus a fair Englishman, if exposed to the sun, becomes dark and swarthy in Bengal; but his offspring, if from an Englishwoman, are born just as fair as he himself was originally: and the children, after any number of generations that we have yet observed, are still born equally fair, provided there has been no intermixture of dark blood.

Moreover, under certain circumstances, with which we are not well acquainted, a more important change of organization occurs. A new character springs up, and is propagated by generation; this constitutes a VARIETY, in the language of naturalists. The number and degree of these variations are confined within narrow limits; they occur chiefly in the domesticated animals, and have not interfered with the transmission and continuation of those forms which constitute species. They will be more particularly considered hereafter.

Proceeding, then, on the criterion of definite form, transmitted by generation, we may define a species as a collection of all the individuals which have descended one from the other, or from common parents, and of all those which resemble them as much as they resemble each other.*

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* These opinions do not need the support of names; or I might cite LOCKE, in whose *Letters on Toleration* all the great principles on which the freedom of the human mind rests are fully developed, and unanswerably established. This may be called speculation, theory, or other bad names: I have therefore pleasure in referring to the authority of a practical statesman and enlightened magistrate. See JEFFERSON's *Notes on Virginia*, p. 261—270. Also the Appendix, No. 3, containing "*An act for establishing Religious Freedom, passed in the Assembly of Virginia in the Beginning of the Year* 1786;"—an admirable model, which has been perfectly successful, and hitherto adopted in no other part of the world.

Thus, our first operation, in classifying the animal kingdom, consists in referring individuals to their species. The next brings together the species most nearly resembling each other, and forms them into groups called GENERA. This presupposes a thorough knowledge of the animals; because the species included under each genus should resemble each other more closely than the species of any other genus. For example, the lion, tiger, lynx, leopard, panther, cat species, with some others, compose the GENUS *felis* or cat. All these have a savage character, as they prey on living animals. For this purpose they are armed with powerful teeth, with great muscular strength in the jaws, neck, and limbs: they all have the tongue and glands penis covered with sharp, horny prickles; and they are furnished with curved, sharp, and cutting nails or claws, which, by a peculiar mechanism, are retracted, so as not to press against the ground when the animal is not employing them. Thus the species in question all agree in the leading points of organization; and they agree likewise in general habits and character. The common cat is the only one actually domesticated; but the lion, tiger, and others, are easily tamed, and rendered familiar to man, although their size and strength make them too dangerous for playfellows; and many admit of training, so that they can be employed in hunting.

The genera are again formed into groups called ORDERS: thus the cow, sheep, goat, deer, antelope, camel, llama, and other genera, compose the ORDER *ruminantia*. All these feed on vegetables, and submit their food to a double process of mastication, in reference to which the stomach possesses a very peculiar and complicated structure. This vegetable diet, and this process of rumination, are connected with certain structures of teeth and jaws, with peculiar arrangements of the organs of sensation and motion, and with certain general habits, which produce great similarity of character throughout the whole order.

The different orders are again arranged into certain CLASSES.

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* CUVIER, *Regne Animal*. t. i. Introduction, p. 19

Thus all the animals which are viviparous, and in which the young are nourished for a certain time by a secretion of the mother, are united into the CLASS *mammalia*, or mammiferous animals; so called from their mammæ, or glandular organs, which secrete the fluid nutriment of the young.

Lastly, the classes are assembled, on the same principle of resemblance, into provinces or DEPARTMENTS of the animal kingdom. The mammalia, birds, fishes, and reptiles, constitute the DEPARTMENT *vertebralia*, or vetebral animals,—all of them possessing a vertebral column or spine, the most important piece of an internal articulated skeleton.

A scheme af the animal kingdom, drawn out on these principles, is called a NATURAL METHOD of distribution; because the natural relations or resemblances of the objects comprised in it are the basis of its formation. To complete it, an accurate knowledge of the whole animated creation is necessary ; so that it cannot be attempted with any reasonable chance of success, except in an advanced state of the science.

When such an arrangement had been properly executed : that is, when the animals have been assigned to each division according to their resemblances of structure, so that the species of each genus are alike, and more like to each other than to those of any other genus ; and when the same remark is true concerning the genera of each order, the orders of each class, and the classes of each department ; it is an abridged expression of the whole science, the embodied result of all our knowledge concerning the structure and habits of animals. The place which any animal occupies denotes all the leading circumstances of its organization and economy, and expresses them in a few words. We say, for example, that the dromedary belongs to the genus CAMELUS, order, RUMINANTIA, class MAMMALIA, and department VERTEBRALIA. To a person, conversant with the principles of the arrangement, these four words convey a general notion of the animal, which would otherwise require a lengthened description.

The great utility of this scientific short-hand writing, in abbreviating descriptions, is too obvious to need illustration ; it is absolutely indispensable when we come to delineate the structure and modifications of organs throughout the whole animal kingdom.

The recent work of CUVIER, entitled the "*Animal Kingdom distributed according to its Organization*," contains the most complete and accurate view of the subject.

If we contemplate living beings arranged in one line, beginning with the most perfect, and continued downwards, we find a tolerably regular gradation from complicated to simple, through the whole series. At one end is man; at the other, an animated microscopic point, of which thousands are found in a single drop of fluid. Numberless gradations are placed between these: so that, though the two ends of the chain are immeasurably remote, there is close approximation between any two links.

This simplification or degradation of the organization is immediately perceptible on comparing together the four great departments[*] of the animal kingdom: and it is equally so in each department. In the VERTEBRALIA, we pass from man to the eel or serpent; in the MOLLUSCA, from the cuttle-fish to the barnacle or oyster; in the ARTICULATA, from the crab or lobster to the earth-worm or leech; in the RADIATA, from the star-fish or medusa to an animalcule of infusions.

The same progression is observable in each class; in the mammalia, for example, we descend from man to the whale or seal.

A cursory general survey of the animal kingdom will shew us the gradual steps by which this simplification of the organization is effected.

The internal articulated skeleton, on which the figure, motions and other important properties of the vertebral animals, which possess it, so much depend, ends in the vertebral department.[†] In some fishes it is reduced to the state of cartilage; and in others, it is so soft as hardly to afford points sufficiently firm for support and motion. External members for locomotion do not exist in some vertebral animals, as serpents and certain fishes.

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[*] The primary division of the animal kingdom into the four departments mentioned in the text, was proposed by CUVIER, in the *Annales du Muséum d'Hist. Nat.* t. 19. The reasons on which the division is grounded, and the principal anatomical characters of the four departments, may be seen in the *Règne Animal*, Introduction, p. 57. et suiv.

[†] Unless we consider as a skeleton the curious and complicated arrangement of connected bony pieces in the asteries; where, however, the principal parts of the bony fabric are not applied, as in the vertebral animals, to the formation of receptacles for the nervous system.

The eyelids and lachrymal apparatus; the external ear and tympanum; the organs of touch and taste; the parts called cerebrum and cerebellum; do not extend beyond this department, nor do they exist in all the animals belonging to this division. The sympathetic nerve belongs only to the vertebral department.*

The diaphragm ends with the mammalia: so that the thorax and abdomen are not distinct in any other animals.

The circulation is reduced in reptiles to the single state, and is carried on by one auricle and ventricle.

Warmth of the blood—that is, a temperature of that fluid considerably elevated above the surrounding medium—belongs only to mammalia and birds; and the red color of the same fluid is confined with one small exception, to the vertebral animals.

Organs of voice end in reptiles; not existing in fishes.

Viviparous generation, with its attendant process of suckling the young, is confined to the mammalia; and is afterwards succeeded by the more simple oviparous form.

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* If the simple nervous structures in some animals of the lower orders should be regarded as a sympathetic nerve, it will not materially affect our view of the subject, so far as the simplification of the organization is concerned. TREVIRANUS regards the knotted abdominal cord of insects and worms as the vertebral ganglia of the sympathetic nerve united into a symmetrical whole. To call it a spinal marrow he thinks incorrect. "Its situation on the abdominal instead of the dorsal aspect of the body, points out a great difference between it and the spinal marrow of the four vertebral classes. The spiders and phalangia, which in other respects are allied to other insects, have no such cord, but, like the mollusca, single ganglia, not placed in a straight direction one behind the other. A true spinal marrow is only found in mammalia, birds, reptiles, and fishes." *Biologie*, b. v. p. 331, 332.

"In this view, the representation that the great sympathetic nerve belongs only to red blooded animals, must be deemed incorrect. This very nerve is the most general, the original of all nerves; but it is variously modified in the different classes. In worms and insects there are merely vertebral ganglia, without the cœliac ganglia of mammalia and birds; in the acephalous mollusca there are the latter, without the former; in the cuttle-fish and snails there are single ganglia of both kinds. All these lower animals have no spinal marrow; fishes and reptiles have one, and also vertebral ganglia; but the cœliac ganglia either do not exist in them, or are not so developed as in birds and mammalia." Ibid. 334–5.

Urinary organs end with the mammalia, many of which have no bladder; as birds, some fishes, and reptiles.

The absorbent system terminates in the vertebral department; of which only the mammalia and birds possess lymphatic glands.

The mollusca present an organization very much reduced in the number of its parts, and very imperfect in all respects, when compared to that of the vertebral animals. They have no skeleton to lodge the nervous system, and form the centre of motions; no separate receptacles for the various internal organs: but the brain, nervous cord, and viscera, are all placed in a common cavity.

In articulated animals, the nervous system is reduced to a knotted cord, and the organs of sense are gradually extinguished. The heart ceases in this department, and respiration also, as carried on by a particular organ.

In the radiated department the organs of circulation finally disappear; the heart having been before abolished. The alimentary apparatus is reduced to a simple bag with one opening. Finally, in the microscopic animalcules all special organs are at an end, and the animated being appears to our senses a spot of mere jelly.

Take any organ or system of organs, and the same progress from complication to simplicity will be apparent. Let us observe the nervous system. In man and the mammalia this apparatus consists of a brain and spinal marrow, securely lodged in bony cases; of cerebral and spinal nerves; of the system of ganglia called the great sympathetic nerve, and of the five external senses. In passing through the mammalia, we observe the brain considerably reduced in size; still farther diminished, and altered in its figure and component parts, in birds: lessened again and greatly simplified, in reptiles and fishes.

In the mollusca, this large apparatus is reduced to one or more small ganglia, with a few slender nerves: to which are added the rudiment of an ear in one instance only, and, in some others, imperfect and almost doubtful organs of vision.

In articulated animals, there is merely a straight cord with a few branches: in some of the more complicated radiated animals, a few almost doubtful nervous branches: and below them, nothing—neither brain, ganglia, nerves, nor organs of sense.

But there would be little inducement to compare together the various animal structures, to follow any apparatus through the whole animal series, unless the structure were a measure and criterion of the function. Just in the same proportion as organization is reduced, life is reduced; exactly as the organic parts are diminished in number and simplified, the vital phenomena become fewer and more simple: and each function ends, when the respective organ ceases. This is true throughout zoology; there is no exception in behalf of any vital manifestations.

The same kind of facts, the same reasoning, the same sort of evidence altogether, which show digestion to be the function of the alimentary canal, the motion of the muscles, and various secretions of their respective glands, prove that sensation, perception, memory, judgment, reasoning, thought—in a word, all the manifestations called mental or intellectual—are the animal functions of their appropriate organic apparatus, the central organ of the nervous system. No difficulty nor obscurity belongs to the latter case, which does not equally affect all the former instances: no kind of evidence connects the living processes with the material instruments in the one which does not apply just as clearly and forcibly to the other.

Shall I be told that thought is inconsistent with matter; that we cannot conceive how medullary substance can perceive, remember, judge, reason? I acknowledge that we are entirely ignorant how the parts of the brain accomplish these purposes—as we are how the liver secretes bile, how the muscles contract, or how any other living purpose is effected;—as we are how heavy bodies are attracted to the earth, how iron is drawn to the magnet, or how two salts decompose each other. Experience is, in all these cases, our sole, if not sufficient instructress: and the constant conjunction of phenomena, as exhibited in her lessons, is the sole ground for affirming a necessary connexion between them. If we go beyond this, and come to inquire the manner how, the mechanism by which these things are effected, we shall find every thing around us equally mysterious, equally incomprehensible,—from the stone which falls to the earth, to the comet traversing the heavens,—from the thread attracted by amber or sealing-wax, to the revolutions of planets in their orbits,—from the formation of a maggot in putrid flesh, or a mite in cheese, to the production of a NEWTON or a FRANKLIN.

In opposition to these views, it has been contended that thought is not an act of the brain, but of an immaterial substance, residing in or connected with it. This large and curious structure, which, in the human subject, receives one fifth of all the blood sent out from the heart, which is so peculiarly and delicately organized, nicely enveloped in successive membranes, and securely lodged in a solid bony case, is left almost without an office, being barely allowed to be capable of sensation. It has, indeed, the easiest lot in the animal economy: it is better fed, clothed, and lodged than any other part, and has less to do. But its office—only one remove above a sinecure—is not a very honorable one: it is a kind of porter, entrusted to open the door, and introduce new comers to the master of the house, who takes on himself the entire charge of receiving, entertaining, and employing them.

Let us survey the natural history of the human mind,—its rise, progress, various fates, and decay; and then judge whether these accord best with the hypothesis of an immaterial agent, or with the plain dictates of common sense, and the analogy of every other organ and function throughout the boundless extent of living beings.

You must bring to this physiological question a sincere and earnest love of truth; dismissing from your minds all the prejudices and alarms which have been so industriously connected with it. If you enter on the inquiry in the spirit of the bigot and partisan, suffering a cloud of fears and hopes, desires and aversion, to hang round your understandings, you will never discern objects clearly; their colors, shapes, dimensions, will be confused, distorted, and obscured by the intellectual mist. Our business is, to inquire what is true; not what is the finest theory; not what will supply the best topics of pretty composition and eloquent declamation, addressed to the prejudices, the passions, and the ignorance of our hearers. We need not fear the result of investigation. Truth is like a native rustic beauty; most lovely when unadorned, and seen in the open light of day. Your fine hypotheses and specious theories are like the unfortunate females who supply the want or the loss of native charms, and repair the breaches of age or disease, by paint, finery, and decorations; which can only be exhibited in the glaring lights, the artificial atmosphere, and the unnatural scenery of the theatre or saloon. Whenever it is thoroughly discussed, truth will not fail to come like tried gold from the fire. Like AJAX, it requires nothing but day-light and fair play.

Reason and free inquiry are the only effectual antidotes of error. Give them full scope, and they will uphold the truth, by bringing false opinions, and all the spurious offspring of ignorance, prejudice, and self-interest, before their severe tribunal, and subjecting them to the test of close investigation. Error alone needs artificial support: truth can stand by itself.

Sir EVERARD HOME, with the assistance of Mr. BAUER and his microscope, has shown us a man eight days old from the time of conception,—about as broad, and a little longer than a pin's head. He satisfied himself that the brain of this homunculus was discernible. Could the immaterial mind have been connected with it at this time? or was the tenement too small even for so etherial a lodger? At the full period of utero-gestation it is still difficult to trace any vestiges of mind; and the believers in its separate existence have left us quite in the dark on the precise time at which the spiritual guest arrives in his corporeal dwelling, the interesting and important moment of amalgamation or combination of the earthly dust and the etherial essence. The Roman-Catholic church has cut the knot, which no one else could untie; and has decided that the little mortal, on its passage into this world of trouble, has a soul to be saved: it accordingly directs and authorizes midwives, in cases of difficult labor, where the death of the infant is apprehended, to baptise it by means of a syringe introduced into the vagina, and thus to save it from perdition.

They, whose scruples are not quite set at rest by the above-mentioned decision of the church, nor by being told that the mind has not yet taken up its quarters in the brain, endeavor to account for the entire absence of mental phenomena at the time of birth, by the senses and brain not having been yet called into action by the impressions of external objects.

These organs begin to be exercised as soon as the child is born:

and a faint glimmering of mind is dimly perceived in the course of the first months of existence: but it is as weak and infantile as the body.

As the senses acquire their powers, and the cerebral jelly becomes firmer, the mind gradually strengthens; slowly advances, with the body, through childhood to puberty; and becomes adult when the developement of the frame is complete; it is, moreover, male or female, according to the sex of the body. In the perfect period of organization, the mind is seen in the plenitude of its powers; but this state of full vigor is short in duration, both for the intellect and the corporeal fabric. The wear and tear of the latter is evidenced in its mental movements: with the decline of organization the mind decays; it becomes decrepit with the body; and both are at the same time extinguished by death.

What do we infer from this succession of phenomena?—the existence and action of a principle entirely distinct from body? or a close analogy to the history of all other organs and functions.

The number and kind of the intellectual phenomena in different animals correspond closely to the degree of developement of the brain. The mind of the Negro and Hottentot, of the Calmuck and the Carib, is inferior to that of the European; and their organization is also less perfect. The large cranium and high forehead of the orang-utang lift him above his brother monkeys; but the developement of his cerebral hemispheres and his mental manifestations are both equally below those of the Negro. The gradation of organization and of mind passes through the monkey, dog, elephant, horse, to other quadrupeds; thence to birds, reptiles, and fishes; and so on to the lowest links of the animal chain.

In ascending these steps of one ladder, following in regular succession at equal intervals, where shall we find the boundary of unassisted organization? where place the beginning of the immaterial adjunct? In that view which assimilates the functions of the brain to those of other organic parts, this case has no difficulty. As the structure of the brain is more exquisite, perfect, and complex, its functions ought to be proportionally so. It is no slight proof of the doctrine now enforced, that the fact is actually thus: that the mental powers of brutes, as far as we can see, are proportional to their organization.

We cannot deny to animals all participation in rational endowments, without shutting our eyes to the most obvious facts,—to indications of reasoning, which the unprejudiced observation of mankind has not failed to recognize and appreciate. Without adverting to the well known instances of comparison, judgment, and sagacity, in the elephant, the dog, and many other animals, let us read the character drawn by HUMBOLDT of the South American mules.

"When the mules feel themselves in danger, they stop, turning their heads to the right and to the left: the motion of their ears seems to indicate that they reflect on the decision they ought to take. Their resolution is slow, but always just, if it be free; that is to say, if it be not crossed nor hastened by the imprudence of the traveller. It is on the frightful roads of the Andes, during journeys of six or seven months across mountains furrowed by torrents, that the intelligence of horses and beasts of burden displays itself in an astonishing manner. Thus the mountaineers are heard to say, 'I will not give you the mule whose step is the easiest, but him who reasons best.'"*

If the intellectual phenomena of man require an immaterial principle superadded to the brain, we must equally concede it to those more rational animals which exhibit manifestations differing from some of the human only in degree. If we grant it to these, we cannot refuse it to the next in order, and so on in succession to the whole series,—to the oyster, the sea-anemone, the polype, the microscopic animalcules. Is any one prepared to admit the existence of immaterial principles in all these cases? If not, he must equally reject it in man.

It is admitted, that an idiot with a malformed brain has no mind; that the sagacious dog and half-reasonable elephant do not require any thing superadded to their brain:—it is allowed that a dog or elephant excels inferior animals, in consequence of possessing a more perfect cerebral structure;—it is strongly suspected that a NEWTON or a SHAKSPEARE excels other mortals only by a more ample developement of the anterior cerebral lobes, by having an extra inch of brain in the right place; yet the immaterialists will not concede the obvious corollary of all these admissions, viz. that the mind of man is merely that more perfect exhibition of mental phenomena which the more complete developement of the brain would lead us to expect; and still perplex us with the gratuitous difficulty of their immaterial hypothesis. Thought, it is positively and dogmatically asserted, cannot be an act of matter. Yet no feelings, no thought, no intellectual operation has ever been seen except in conjunction with a brain; and living matter is acknowledged by most persons to be capable of what makes the nearest possible approach to thinking. The strongest advocate for immaterialism seeks no further than the body for his explanation of all the vital processes, of muscular contraction, nutrition, secretion, &c.—operations quite as different from any affection of inorganic substance, as reasoning or thought;—he will even allow the brain to be capable of sensation.

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* *Personal Narative*, v. iii.

Who knows the capabilities of matter so perfectly, as to be able to say that it can see, hear, smell, taste, and feel, but cannot possibly reflect, imagine, judge? Who has appreciated them so exactly, as to be able to decide that it can execute the mental functions of an elephant, a dog, or an orang-utang, but cannot perform those of a Negro or a Hottentot?

To say that a thing of merely negative properties, that is, an immaterial substance, which is neither evidenced by any direct testimony, nor by any indirect proof from its effects, does exist, and can think, is quite consistent in those who deny thought to animal structures, where we see it going on every day.

If the mental processes be not the function of the brain, what is its office? In animals which possess only a small part of the human cerebral structure, sensation exists, and in many cases is more acute than in man. What employment shall we find for all that man possesses over and above this portion,—for the large and prodigiously-developed human hemispheres? Are we to believe that these serve only to round the figure of the organ, or to fill the cranium?

It is necessary for you to form clear opinions on this subject as it has immediate reference to an important branch of pathology.

They who consider the mental operations as acts of an immaterial being, and thus disconnect the sound state of the mind from organization, act very consistently in disjoining insanity also from the corporeal structure, and in representing it as a disease, not of the brain, but of the mind. Thus we come to disease of an immaterial being, for which, suitably enough, moral treatment has been recommended.

I firmly believe, on the contrary, that the various forms of insanity, that all the affections comprehended under the general terms of mental derangement, are only evidences of cerebral affections, disordered manifestations of those organs whose healthy action produces the phenomena called mental; in short, symptoms of diseased brain.

These symptoms have the same relation to the brain, as vomiting, indigestion, heartburn, to the stomach; cough, asthma, to the lungs; or any other deranged functions to their corresponding organs.

If the biliary secretion be increased, diminished, suspended, or altered, we have no hesitation in referring to changes in the condition of the liver, as the immediate cause of these phenomena. We explain the state of respiration, whether slow, hurried, impeded by cough, spasm, &c. by the various conditions of the lungs and other parts concerned in breathing. These explanations are deemed perfectly satisfactory.

What should we think of a person who told us that the organs have nothing to do with the business; that cholera, jaundice, hepatitis, are diseases of an immaterial hepatic being; that asthma, cough, consumption, are affections of a subtile pulmonary matter; or that in both cases the disorder is not in bodily organs, but in a vital principle? If such a statement would be deemed too absurd for any serious comment in the derangements of the liver, lungs, and other organic parts, how can it be received in the brain?

The very persons who use this language of diseases of the mind, speak and reason correctly respecting the other affections of the brain. When it is compressed by a piece of bone, or by effused blood or serum, and when all intellectual phenomena are more or less completely suspended, they do not say that the mind is squeezed, that the immaterial principle suffers pressure. For the ravings of delirium and phrenzy, the excitation and subsequent stupor of intoxication, they find an adequate explanation in the state of the cerebral circulation, without fancying that the mind is delirious, mad, or drunk.

In these cases the seat of the disease, the cause of the symptoms is too obvious to escape notice. In many forms of insanity the affection of the cerebral organization is less strongly marked, slower in its progress; but generally very recognizable, and abundantly sufficient to explain the diseased manifestation,—to afford a material organic cause for the phenomena—for the augmented or diminished energy, or the altered nature of the various feelings and intellectual faculties.

I have examined after death the heads of many insane persons, and have hardly seen a single brain which did not exhibit obvious marks of disease; in recent cases, loaded vessels, increased serous secretions:—in all instances of longer duration, unequivocal signs of present or past increased action: bloodvessels apparently more numerous, membranes thickened and opaque, depositions of coagulable lymph forming adhesions or adventitious membranes, watery effusions, even abscesses: add to this, that the insane often become paralytic, or are suddenly cut off by apoplexy.

Sometimes, indeed, the mental phenomena are disturbed without any visible deviation from the healthy structure of the brain: as digestion or biliary secretion may be impaired or altered without any recognizable change of structure in the stomach or liver. The brain, like other parts of this complicated machine, may be diseased sympathetically; and we see it recover.

Thus we find the brain, like other parts, subject to what is called functional disorder; but, although we cannot actually demonstrate the fact, we no more doubt that the material cause of the symptoms or external signs of disease is in this organ, than we do that impaired biliary secretion has its source in the liver, or faulty digestion in the stomach. The brain does not often come under the inspection of the anatomist, in such cases of functional disorder; and I am convinced, from my own experience, that very few heads of persons dying deranged will be examined after death, without showing diseased structure, or evident signs of increased vascular activity.

The effect of medical treatment completely corroborates these views. Indeed, they who talk of and believe in diseases of the mind, are too wise to put their trust in mental remedies. Arguments, syllogisms, discourses, sermons, have never yet restored any patient; the moral pharmacopœia is quite inefficient; and no real benefit can be conferred without vigorous medical treatment, which is as efficacious in these affections as in the diseases of any other organ.

In thus drawing your attention to the physiology of the brain, I have been influenced not merely by the intrinsic interest and importance of the subject, but by a wish to exemplify the aid which human and comparative anatomy and physiology are capable of affording each other, and to show how the data furnished by both tend to illustrate pathology. I have purposely avoided noticing those considerations of the tendency of certain physiological doctrines, which have sometimes been industriously mixed up with these disquisitions. In defence of a weak cause, and in failure of direct arguments, appeals to the passions and prejudices have been indulged; attempts have been made to fix public odium on the supporters of this or that opinion; and direct charges of bad motives and injurious consequences have been reinforced by all the arts of misrepresentation, insinuation, and inuendo.

To discover truth, and to represent it in the clearest and most intelligible manner, seem to me the only proper objects of physiological, or indeed of any other inquiries. Free discussion is the surest way, not only to disclose and strengthen what is true, but to detect and expose what is fallacious. Let us not then pay so bad a compliment to truth, as to use in its defence foul blows and unlawful weapons. Its adversaries, if it has any, will be dispatched soon enough without the aid of the stiletto and the bowl.

The argument against the expediency of divulging an opinion, although it may be true, from the possibility of its being perverted, has been so much hackneyed, so often employed in the last resort by the defenders, of all established abuses and errors, that every one, who is conversant with controversy, rejects it immediately, as the sure mark of a bad cause, as the last refuge of retreating error.

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ON THE
NATURAL HISTORY
OF
MAN.

The following remarks on those parts of the natural history of our species, which admit of illustration from human and comparative anatomy and physiology, formed twelve Lectures, delivered after the three foregoing, at the Royal College of Surgeons, in the past summer (1818). They are here arranged according to the natural divisions of the subject, without any reference to the arbitrary distinctions of the particular Lectures, which are therefore entirely omitted.

CHAPTER I.

Nature and Objects of the Inquiry; and Mode of Investigation: the subject hitherto neglected and very erroneous notions consequently prevalent.—Sources of Information.—Anatomical Characters of the Monkey Tribe, and more particularly of the Orang-utang and Chimpansé.—Specific Character of Man.

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"Mirantur aliqui altitudines montium, ingentes fluctus maris, altissimos lapsus fluminum, et gyros siderum :—relinquunt seipsos, nec mirantur."

STUS. AUGUSTINUS.

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THE natural history of man, in its most comprehensive sense, constitutes a subject of immense extent and of endless variety; or rather includes several very important subjects, if we attempt to describe both the individual and the species. In a complete history of man, it would be necessary, in respect to the former, to relate the phenomena of his first production, to examine his anatomical structure, his bodily and intellectual functions, his propensities, and feelings, his diseases,—and to pursue his progress from the time of birth to the grave: in reference to the latter, to point out the circumstances that distinguish him from other animals, and determine the precise degree and kind of resemblance or difference, of specific affinity or diversity between them and ourselves; to compare or contrast with each other the various nations or tribes of human beings; to delineate the physical and moral characters of the people inhabiting the different portions of the globe, and to trace their progress from the first rudiments of civil society to the state at which they are now arrived. To write such a history of our species would demand a familiar acquaintance with nearly the whole circle of human knowledge, and a combination of the most opposite pursuits and talents. This labor, much too extensive to be properly executed by any individual, is divided into several subordinate branches. The anatomist and physiologist unfold the construction and uses of the corporeal mechanism; the surgeon and physician describe its diseases; while the metaphysician and moralist employ themselves with those functions which constitute the mind, and with the moral sentiments. Man in society, his progress in the various countries and ages of the world, his multiplication and extension, are the province of the historian and political economist.

I design on the present occasion, to consider man as an object of zoology,—to describe him as a subject of the animal kingdom. I shall therefore first enumerate, and consider, the distinctions between him and animals; and shall then describe, and attempt to account for, the principal differences between the various races of mankind.

Although the questions, which come before us in such a review of the subject as I now speak of, are of very high interest and importance,—and although the principles derived from these investigations throw a strong light on many dark points in metaphysics and morals, in legislation, history, antiquities, and the fine arts,—we shall find that they have not been investigated with a corresponding degree of attention and perseverance.

What climates, what degrees of heat and cold, can man bear? How is he able to endure all the diversified external influences of such various abodes? Is he indebted for this privilege to the strength and flexibility of his organization, or to his mental functions, his reason, and the arts which he has thence derived? Is he a species broadly and clearly distinguished from all others; or is he specifically allied to the orang-utang and other monkeys? What are his corporeal, what his mental distinctions? Are the latter different in kind, or only superior in degree to those of the higher animals? Is there one species of men only, or are there many distinct ones? What particulars of external form and inward structure characterize the several races? What relation is observed between the differences of structure, and those of moral feeling, mental powers, capability of civilization, and actual progress in arts, sciences, literature, government? How is man affected by the external influences of climate, food, way of life? Are these, or any others, operating on beings originally alike, sufficient to account for all the diversities hitherto observed; or must we suppose that several kinds of men were created originally, each for its own situation? If we adopt the supposition of a single species, what country did it first inhabit? and what was the appearance of the original man? Did he go erect, or on all fours? Was he a Patagonian, or an Eskimau, a Negro, or a Georgian?

Such are the inquiries that claim our attention in a zoological survey of the human species. To suppose that it is in my power to furnish satisfactory replies, would be a degree of presumption which it is hardly necessary for me to disclaim. I mention them only as examples; and I take the liberty of adding my firm conviction, that these and similar matters will never be cleared up, except by those who are thoroughly acquainted with the anatomy and physiology of our frame; with comparative anatomy; with the principles of general physiology, and the analogies derivable from the whole extent of living nature. I shall be contented with having called your attention to a subject which falls within the province of our own pursuits; and with exhibiting specimens of the mode of proceeding, and the objects to be kept in view. The natural history of man is, indeed, yet in its infancy; so that a complete view of the subject could not be attempted. The description and arrangement of the various productions of the globe have occupied numerous observers in all ages of the world; and have engaged their attention so exclusively, that they have had no time to think of themselves. Every reptile, bird, insect, plant, even every mineral, has had its historian, and been described with minute accuracy; while the human subject has been comparatively neglected. In a voluminous work now publishing in this country, entitled *General Zoology*, or *Systematic Natural History*, man is altogether omitted, without notice or apology. Accurate, beautiful, and expensive engravings have been executed of most objects in natural history, of insects, birds, plants; splendid and costly publications have been devoted to small and apparently insignificant departments of this science; yet the different races of man have hardly in any instance been attentively investigated, described, or compared together; no one has approximated and surveyed in conjunction their structure and powers; no attempt has been made to delineate them,—I will not say on a large and comprehensive, but not even on a small and contracted scale: nobody has ever thought it worth while to bestow on a faithful delineation of the several varieties of man one tenth of the labor and expense which have been lavished again and again on birds-of-paradise, pigeons, parrots, humming-birds, beetles, spiders, and many other such objects. Even intelligent and scientific travellers have too often thrown away, on dress, arms, ornaments, utensils, buildings, landscapes, and obscure antiquities, the utmost luxury of engraving and embellishment; neglecting entirely the being, without reference to whom none of these objects possess either value or interest. In many very expensive works, one is disappointed at meeting, in long succession, with prints of costumes, summer dresses and winter dresses, court and common dresses; the wearer in the mean time being entirely lost sight of.[*] The immortal historian of Nature seems to have alluded to this strange neglect, in observing " quelqu' intérêt que nous ayons a nous connaître nous mêmes, je ne sais si nous ne connaissons pas mieux tout ce qui n'est pas nous."[†] Indeed, whether we investigate the physical or the moral nature of man, we recognise at every step the limited extent of our knowledge, and are obliged to confess that ignorance which a **Rousseau** and a **Buffon** have not been ashamed to avow:—"The most useful, and the least successfully cultivated of all human knowledge, is that of man; and the inscription[*] on the temple of Delphi contained a more important and difficult precept than all the books of the moralists."[†]

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[*] Among the few works in which we meet with characteristic delineations of the human species deserving confidence, may be mentioned,

Voyages de C. Le Brun, *par la Moscovie, en Perse, et aux Indes Orientales*, 2 t. fol.

Cook's *Voyage towards the South Pole, and round the World*, 2 v. 4to. 1777.

Cook's *Voyage to the Pacific Ocean*, 3 v. 4to. 1785; with folio Atlas. Both these contain numerous excellent representations of the human subject.

Peron, *Voyage aux Terres Australes*, tom. I. has the best figure of human heads yet published. There are numerous heads in Denon, *Voy. dans la Haute et Basse Egypte*, pl. 104—112: and some in the unrivalled *Déscription de l'Egypte;* Etat moderne. A few other references will be found in the course of this work.

[†] " De la Nature de l' Homme." *Hist. Nat.* t. 2. This great naturalist and eloquent writer must be excepted from the remarks in the text. He treats largely of man in the 2d and 3d volumes of the *Histoire naturelle, générale et particulière.*

That the greatest ignorance has prevailed on this subject, even in modern times, and among men of distinguished learning and acuteness, is shown by the strange notion very strenuously asserted by **Monboddo**[‡] and **Rousseau**, and firmly believed by many, that man and the monkey, or at least the orang-utang, belong to the same species, and are no otherwise distinguished from each other than by circumstances which can be accounted for by the different physical and moral agencies to which they have been exposed. The former of these writers even supposes that the human race once possessed tails; and he says, "The orang-utangs are proved to be of our species, by marks of humanity that I think are incontestable." A poor compliment to our species; as any one will think, who may take the trouble of paying a morning visit to the orang-utang at Exeter Change.

Misled by his strange and fanciful notions of the unnatural condition of man in society, **Rousseau** has even applied the observations of travellers concerning animals to man: and if we think fit to believe with him, that he knew better what they saw than they did themselves, we may arrive at this conclusion, concerning the existence of wild men in an insulated and solitary state, similar to that of wild beasts.[||]

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[*] Know thyself.

[†] *Discours sur l'Inégalité*; Preface.

[‡] *On the Origin and Progress of Language*, v. 1; and *Ancient Metaphysics*, v. 3.

[||] "Toutes ces observations sur les variétés que mille causes peuvent produire, et ont produit en effet dans l'espèce humaine, me font douter si divers animaux semblables aux hommes, pris par des voyageurs pour des bêtes sans beaucoup d'examen ou a cause de quelques différences qu'ils remarquoient dans la conformation extérieure, ou seulement parce que ces animaux ne parloient pas, ne seroient point en effet de *véritables hommes sauvages*, dont la race dispersee

The completely unsupported assertions of **Monboddo** and **Rousseau** only show that they were equally unacquainted with the structure and functions of men and monkeys; not conversant with zoology and physiology, and therefore entirely destitute of the principles on which alone a sound judgment can be formed concerning the natural capabilities and destiny of animals, as well as the laws according to which certain changes of character, certain departures from the original stock, may take place.

Mankind in general, the unlearned and the unscientific, do not commit the gross mistake of confounding together man and animals: this distinction, at least, so clear and obvious to common observation and unprejudiced common sense, is preserved in their short division of the animal kingdom into man and brutes.

Other writers, who expatiate with vast delight on what they call the regular gradation or chain of beings, and discover great wisdom of the Creator, and great beauty of the creation, in the circumstance, that nature makes no leaps, but has connected the various objects of the three kingdoms together like the steps of a staircase, or the links of a chain, represent man only as a more perfect kind of monkey; and condemn the poor African to the degrading situation of a connecting link between the superior races of mankind and the orang-utang. Such is the view exhibited by Mr. **White**, in his *Account of the regular Gradation in Man, and in different Animals and Vegetables, and from the former to the latter*;* where he distinctly asserts that "the orang-utang has

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anciennement dans les bois n'avoit eu occasion de développer aucune de ses facultés virtuelles, n'avoit acquis aucun degré de perfection, et se trouvoit encore dans l'état primitif de nature." *Lib. cit.*

* Besides the subject of gradation from man to animals and vegetables, this work includes observations on the varieties of organization in mankind, which the author accounts for by the supposition of species originally distinct, although he has omitted to fix the number and define the characters of those species. I expect to show hereafter that this opinion is entirely ungrounded. Mr **White** indulges frequently in a looseness of expression and reasoning, which renders his meaning very obscure. When he compares *the African* to *the European*, the statement is not very precise; but when he brings in *the Asiatic*, as if all the human beings in that immense region were marked with one and the same character, the language conveys to us either no definite sense, or one completely wrong

the person, the manner, and the actions of man" (p. 35); and that the Negro "seems to approach nearer to the brute creation than any other of the human species." (p. 42.) If, by regular gradation, nothing more is meant than the variety of organization and its progressive simplification from man throughout the animal kingdom, the truth is incontestable, and too obvious to require a quarto for its illustration or support. On the contrary, if it be designed to assert identity of species between ourselves and monkeys, the position is quite untenable. At all events, both the statements quoted above are more or less incorrect.

That the negro is more like a monkey than the European, cannot be denied as a general observation. But why is the Negro always selected for this comparison? The New Hollander, the Calmuck, the native American, are not superior to the Africans, and are as much like monkeys. Why then is the Negro alone to be depressed to a level with the brute? to fill up the break in Mr. WHITE's chain between the European and the monkey?

I do not hesitate to assert, that the notion of specific identity between the African and orang-utang (on which point Mr. WHITE's language is not sufficiently clear to enable me to decide what he means) is as false, philosophically, as the moral and political consequences, to which it would lead, are shocking and detestable. The human species has numerous distinctive marks, by which, under every circumstance of deficient or imperfect civilization, and every variety of country and race, it is separated by a broad and clearly defined interval from all other animals, even of those species which, from their general resemblance to us, have been called anthropomorphous.

It is only of late years, and principally through the labors, the lectures, and the excellent writings of BLUMENBACH,* that the natural history of man has begun to receive its due share of attention;

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* He chose the varieties of mankind for the subject of his inaugural thesis; Götting. 1775, 4to.; and afterwards published it under the title *De Generis Humani Varietate Nativa*, 12mo of which the third and last edition appeared in 1795. See also his *Decades Craniorum diversarum Gentium illustratæ*; 1-5; Götting, 1790—1808: his *Beyträge zur Naturgeschichte*; I. u. 2. theil, Gött. 1790 and 1811: his *Handbuch der Naturgeschichte*: ed. 9, 1814; and his *Abbildungen Naturhistorischer Gegenstände*; more particularly 1. heft.

and I have no hesitation in asserting, that, whether we regard the intrinsic importance of the questions that arise, and their relation to the affinities, migrations, and history of nations, or advert merely to the pleasure of the research, no subject will be found more worthy of minute investigation. The example of Buffon and Blumenbach has been followed by some others; as Zimmerman,[*] Meiners,[†] Soemmering,[‡] Ludwig,[§] in Germany[‖]; Hunter[¶] and Kaimes[**] in Scotland; Smith[††] in America; and Dr. Prichard[‡‡] in this country, whose clear statements, convincing reasoning, and very extensive information, stamp the highest value on his interesting work, and distinguish it very advantageously from most other productions on the same subject.

Linneus places man in the order *primates* of the class MAMMALIA; and has given him for companions, the monkeys, lemurs, and bats; of which the latter, at least, must be not a little surprised at finding themselves in such a situation and company. The characters of his order are, "Front teeth incisors; the superior, four; parallel. Two pectoral mammæ."

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[*] *Geographische Geschichte der Menschen und der allgemein verbreiteten vierfüssigen Thieren*, 3 v. 8vo. Leipsic, 1778—1783.

[†] *Grundriss der Geschichte der Menschheit*; Lemgo, 1793. A short but interesting work; particularly valuable from the very extensive erudition of the author; and from a copious catalogue of books, accompanied with short notices of their character.

Gottingisches Historiches Magazin, 11 v. His work entitled *Verschiedenheit der Menschen-naturen*, which I have not seen, contains, I believe, the detached essays and treatises of the *Historisches Magazin* collected together and arranged.

[‡] *Uber die korperliche Verschiedenheit des Negers vom Europær*, 8vo. Frankfort, 1785.

[§] *Grundriss der Naturgeschichte der Menschen Species*; Leipsic, 1796.

[‖] Some other books have been published in Germany, with which I am not acquainted; viz. J. R. Forster und Klugel *Abbildungen merkwürdiger Völker und Thiere*; Hallo, 1793, 8vo.

G. Forster und Sprengel *Beyträge zur Völker und Länderkunde.*

[¶] *Diss. Inaug. de Hominum Varietatibus*; Edinburgh, 1775: and in Webster's *Collection*,

[**] *Sketches of the History of Man*; 2 v. 8vo. Edinburgh.

[††] *Essay on the Causes of the Variety of Complexion and Figure in the Human Species*; Philadelphia: reprinted London, 1789.

[‡‡] *Disp. Inaug. de Hominum Varietatibus*; Edinb. 1808: greatly enlarged and translated into English under the title, *Researches on the Physical History of Man*; 8vo. 1812

The principles must be incorrect, which lead to such an approximation.

As the monkey race approach the nearest to man in structure and actions, and their forms are so much like the human as to have procured for them the epithet *anthropo-morphous*, we must compare them to man, in order to find out the specific characters of the latter; and we must institute this comparison particularly with those called orang-utangs. I shall have frequent occasion, in this part of the subject, to mention the latter animal; it is, therefore, necessary to explain clearly what creature I mean to designate by that name; and the more so, as two distinct species, and sometimes perhaps more, have been confounded under that common appellation. This is the case even with LINNEUS, BUFFON, and ERXLEBEN; in whom the mistake is easily accounted for by the rareness of the animals, both of which are very seldom seen in Europe. BLUMENBACH has pointed out and rectified the error, both in his *Manual of Natural History, and in his Delineations of Objects in Natural History*

All the simiæ, and the lemurs likewise, are *quadrumanous*; that is, they possess opposable members, or thumbs on the hind as well as on the fore limbs: they have perfect clavicles; perfect pronation and supination of the fore arm; long and flexible fingers and toes: hence, they have the power of imitating many human actions; hence too, they are excellent climbers. On the other hand, they cannot easily stand or walk upright: because their foot rests on the outer edge, the heel does not touch the ground, and the narrowness of the pelvis renders the trunk unsteady. Consequently, they are neither biped, nor strictly quadruped. They resemble man in the general form of the cranium, and in the configuration of the brain; of which, however, the cerebral hemispheres are greatly reduced. The face is turned forwards; the optic axes are parallel; the orbits complete, and separate from the temporal fossæ. The nose is flat (hence the name *simia*, from *simus*, 'flat-nosed,') and has a singular triangular os nasi.

In this QUADRUMANOUS order there is a constantly increasing deviation from the human structure, by increased elongation of the muzzle, and advances to the quadruped attitude and progression. They have the same number and kinds of teeth as man; and an alimentary canal very much like the human, their pectoral mammæ and loose penis are other approximations.

In so large a family as the monkeys, we shall expect to meet with considerable varieties of form; and to find that the human character is strongly expressed in some, while others exhibit successive degrees of approximation towards the neighboring animals.

The division of ORANGS, which is the most strongly anthropomorphous, and includes the two simiæ, confounded together under the names of orang-utang, pongo, jocko, barris, &c., and two others called gibbons (*S. Lar*, or long-armed monkey; *S. Leucisca*, or wouwou), is characterized by the slight prominence of the jaws, so that they have a large facial angle; by the want of tail; by possessing an os hyoides, liver, and cæcum like the human: the latter part has an appendix vermiformis, as in man, They have very long arms.

The *simia satyrus** is the true animal so much celebrated under the name orang-utang.† It is principally, if not solely, found on the great island of Borneo, whence it has been sometimes brought to us through Java. It is about three feet in height. As the specimens conveyed hither have been young, we may suppose that it would reach to between three and four feet when grown up; but none have been seen in Europe exceeding three feet. The body is covered with strong reddish brown hair. The front of the head has a very human character, the forehead being large and high, and the facial angle consequently considerable: indeed, no animal approaches to man so nearly as this, in the form of the head and volume of the brain. The face is bluish or lead-colored: there are no cheek pouches, nor callosities of the buttocks. Two large membranous bags cover the front of the neck under the skin, and open into the larynx between the os hyoides and thyroid cartilage; a structure which spoils him for speaking. The thumb of the hind hand has no nail.[*] It is a mild and gentle animal, with some actions similar to ours, and some appearances of human feelings. It soon becomes attached, and imitates very quickly whatever we do. A state of captivity, in climates and with diet unfriendly to its nature, is not well calculated to develop its feelings and powers, or to lead to a just estimate of its faculties and intelligence.

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* BLUMENBACH, *Abbildungen n. h. Gegenstände;* No. 12; the cranium, No. 52, The animal has been figured by VOSMAER, from a living specimen at the Hague, from which engraving that of BLUMENBACH is copied; by Camper (who has also given a detailed anatomical description of it), with his usual fidelity and accuracy,from a dead specimen preserved in spirits; *Œuvres d'Histoire Nat. &c.* planche 1. fig. 1. Fig 1, 2 3, 4, and 5, of the same plate, are representations of the entire and bony head; and most excellently, in a colored engraving, by Mr. ABEL, who brought one with him from Batavia (now alive in Exeter Change), and has given a very interesting description of him in his *Narrative of a Journey in the interior of China.*

† The import of this Malay term is 'wild man,' or 'man of the wood.' 'Orang' means, in fact, rational creature; and is applied to man, to the monkey in question, and to the elephant.

The reports of travellers concerning its immense strength and ferocity, its stature represented as equal or superior to that of man, its carrying off women, and so forth, do not accord either with the size or the dispositions of the creature as observed in the examples brought into Europe. They must probably be referred partly to exaggeration and partly to the circumstance of other large simiæ particularly the pongo[†] of Borneo) having been confounded with the true orang-utang.

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[*] The absence of the nail was ascertained by CAMPER, in seven out of eight specimens: the eighth had a very small nail on the thumb of the right foot only. *Œuvres*, i. p. 53. et suiv. The animal is represented by EDWARDS, *Gleanings of Natural History*, i pl. 213, p. 6 and 7, with nails, and it was so figured in the proof of an engraving submitted to the inspection of CAMPER by ALLAMAND; *Additions aux* xv. *de* BUFFON, p. 73, pl. 11. On examining the animals, from which both these figures were taken, it was found that they had no nails; and the same is the case with that of Mr. ABEL. Such is the way in which nature is often *improved* by artists who do not understand natural history! CAMPER, *de l'Orang-utang*, ch. i. § 4.

[†] In a Memoir read before the Academy of Sciences, but not yet published CUVIER has endeavored to prove that this tremendous creature is only the adult S. Satyrus. They are both confined to the Island of Borneo; and they agree

The *simia troglodytes*[*] is a native of Angola and Congo, where it is called by the natives, chimpansé. It resembles the former in size, but differs from it in being covered by black hair; in having a lower forehead, and large ears; and nails on the thumbs of the hind hands. It is very susceptible of education, and quickly learns to imitate human actions. This is the animal of which TYSON[†] has given an excellent anatomical description, accompanied with very good engravings. In both these simiæ, the hair of the upper and fore arms takes opposite directions; that is it slants in each part of the limb towards the elbow.

A more minute and accurate account of the propensities, feelings, and intellectual phenomena of both these creatures is a great desideratum in that important branch of comparative physiology, which relates to the functions of the brain.

The peculiar characteristics of man appear to me so very strong, that I not only deem him a distinct species, but also put him into a separate order by himself. His physical and moral attributes place him at a much greater distance from all orders of mammalia, than those are from each other respectively. The zoological statement of his principal character follows :[‡]

ORDER, bimanum (two-handed); GENUS, homo; the species single; with several varieties hereafter enumerated.

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in the great length of the arms, and the prominence and strength of the spinous processes of the cervical vertebræ. The skulls of both are in the Hunterian Collection; and are strongly contrasted to each other in the relative proportions of the cranium and face, as well as in some other points. If these are merely the differences between the young and the full-grown animal, I know no other example of such a metamorphosis in the animal kingdom. For the skull of the orang-utang see the plate of BLUMENBACH already quoted; for that of the pongo, FISCHER *Naturhistorische Fragmente*, tab. 3 & 4. I must, however, acknowledge that the head of the individual at Exeter Change comes much nearer to that of the pongo than either the cranium figured by BLUMENBACH, or that in the Hunterian Collection; and the resemblance seems to me to increase with the animal's growth.

[*] A good engraving from a living original is found in LE CAT, *Traité du Fluide des Nerfs*: it is copied from BLUMENBACH, *Abbild. N. H. G.* No. 11.

[†] *The Anatomy of a Pigmy, compared with that of a Monkey, an Ape, and a Man.*

[‡] BLUMENBACH. CUVIER.

Characters; erect stature; two hands; teeth approximated and of equal length; the inferior incisors perpendicular. Prominent chin; rational; endowed with speech; unarmed; defenceless.

These circumstances are so obvious, and so abundantly sufficient to characterize man, that the doubts and hesitation of Linnæus, in assigning a specific distinction, appear to us rather incomprehensible:—"Nullum characterem," he observes, "hactenus eruere potui, unde homo a simia internoscatur."* And he again states, in the *Systema Naturæ*,† "Mirum adeo parum differre stultissimam simiam a sapientissimo homine, ut iste geodætes naturæ etiamnum quærendus, qui hos limitet." If these representations were correct, zoology would not deserve the rank of a science.

The remainder of this work will be divided into two sections; the first, on the (corporeal and mental) difference between man and animals—or, in other words, on the specific character of man—will contain a detailed explanation of the particulars composing that character, a commentary on the short zoological statement which immediately precedes, and an attempt to settle the question, whether man be a distinct species, or have a common origin with and specific affinity to any other animals: the second will be devoted to the different races of mankind, will contain an enumeration and discussion of the characters by which they are distinguished, and a full consideration of the question, whether they ought to be regarded as originally distinct species, or as varieties of one single species.

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* *Fauna Suecica*, Præf.

† Ed. 12, p. 34, note

SECTION I.

DISTINCTIONS BETWEEN MAN AND ANIMALS; OR SPECIFIC CHARACTERS OF MAN.

CHAPTER II.

The Erect Attitude of Man, and consequent Peculiarities in the Structure of the Lower Limbs, Thorax, Spine, and Pelvis.

In the external conformation of man, we immediately remark his upright stature; that majestic attitude, which announces his superiority over all the other inhabitants of the globe. He is the only being adapted by his organization to go erect. Enslaved to their senses, and partaking merely of physical enjoyments, other animals have their heads directed towards the earth:

> Quæ natura prona, atque ventri obedientia finxit.

Man, whose more elevated nature is connected to surrounding objects by moral relations, who can pursue the concatenations of causes and effects, and embrace in his mind the system of the universe, boldly regards the heavens, and can direct his sight even into the starry regions. The contrast, so finely expressed by the poet, is therefore quite correct in fact:

> Pronaque cum spectent animalia cetera terram,
> Os homini sublime dedit; cœlumque tueri.
> Jussit; et erectos ad sidera tollere vultus.

I propose to prove that the erect stature is suited to the organization of the human subject; and that it is exclusively peculiar to man.

It might appear a sufficient proof of the upright attitude and biped progression being natural to our species, that such has been the invariable practice of all nations in all ages of the world:—that no people, no tribe, nor even any individual in a healthy condition, has been known to do otherwise. Yet even this has been contested; and, as philosophers have not been wanting to argue that we were naturally furnished with tails, but by some strange change or chance, had got rid of the degrading appendage; so others have held that we were designed by nature to go on all fours;[*] justifying the acute remark, "Nihil tam absurdum esse, quod non ab aliquo philosopho dictum fuit."

The chief support of this notion concerning the human subject being naturally quadruped, has been derived from the examples of *wild men*; that is, children lost in woods, and growing up in a solitary state. Even Linneus has kindly taken them under his protection, and has provided a respectable situation for them in his *Systema Naturæ*, under the head of "homo sapiens *ferus*," to whom he assigns the epithets *tetrapus*, *mutus*, *hirsutus*.

What is this 'homo ferus' of Linneus? How are we to consider these wild men? In different countries of Europe, a few individuals—and very few indeed are authentically recorded—have been met with in a solitary state;—young persons, wandering alone in woods, or mountainous regions. To unsophisticated common sense, they appear poor, half-witted, stupid beings, incapable of speech, with faculties very imperfectly developed, and therefore probably escaping from or abandoned by their parents or friends. But their case has been eagerly taken up and warmly defended by some philosophers, who employ them to exemplify *natural* man—the original uncorrupted creature—in opposition to those who have become vitiated and degenerate by civilization. When presented to us in so important a character, and with such high pretensions, it is necessary to inquire a little into the proofs of their pedigree and claims.

Peter the Wild Boy, who lived many years in this country, is one of the most authentic cases; and his biography will answer the purpose very well.* In July, 1724, Jurgen Meyer, a townsman of Hameln, met in his field with a naked, brownish, black-haired boy, apparently about twelve years old, who uttered no sound, was enticed, by shewing him two apples, into the town, and placed, for safe-custody, in an hospital, by order of the burgomaster Severin. Peter—thus he was christened by the children on his first appearance in the town, and he went by the same name to his death—behaved rather brutish at first; seeking to get out at doors and windows, resting now and then on his knees and elbows, and rolling himself from side to side till he fell asleep. He did not like bread; but he eagerly peeled green sticks, and chewed the peel for juice, as he also did vegetables, grass, and bean-shells. He soon learned to conduct himself more properly, and was allowed to go about the town. When any thing was offered him to eat, he first smelt it, and then put it in his mouth, or laid it aside, shaking his head. In the same way he would smell people's hands, and then strike his breast, if pleased, or otherwise shake his head. When he particularly liked any thing, as beans, peas, mulberries, fruit, and particularly onions and nuts, he indicated his satisfaction by striking repeatedly on his chest.

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[*] Moscati, *von der körperlichen wesentlichen Unterschiede zwischen der Structur der Menschen und der Thiere*; Götting. 1771. 8vo.

Schrage, a Dutchman, in a Dutch journal, entitled *Gencesnatuuren Huishoud-kundige Jaarbocken*. T. 3. p. 32.

When shoes were first given to him, he could not walk in them, and appeared happy in getting rid of them, and again running about barefooted. Covering the head was equally unpleasant to him; and he enjoyed greatly throwing his hat or cap into the Weser, and seeing it swim down. But he soon became accustomed to clothing.

His hearing and smell were acute.

In October 1725, he was sent for by George I. to Hanover; whence he was transmitted to London in the beginning of the following year, under the care of a king's messenger, and this was the foundation of his fame and fortune.

Just at this time the controversy about the existence of innate ideas was at its height; and Peter seemed the very subject for determining the question. Count Zinzendorf wished that he should be entrus'ed to his charge, that he might watch the developement of his innate ideas; but the King had already placed him at the disposal of the Princess of Wales, the afterwards celebrated Queen Caroline, who confided the precious trust to Dr. Arbuthnot, still for the purpose of investigating his *innate ideas*.

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* The following account is derived from Blumenbach's *Beyträge zur Naturgeschichte*, 2 theil. He has taken great pains to make out, from original and cotemporary documents, the true history of this *homo sapiens ferus*.

Swift has immortalised him in his humorous production, *It cannot rain, but it pours; or, London strewed with Rarities.* Linneus gave him a niche in the *Systema Naturæ*, under the denomination of "Juvenis Hanoveranus:" Buffon, De Paauw, and J. J. Rousseau, have extolled him as the true child of nature, the genuine unsophisticated man. Monboddo* is still more enthusiastic, declaring his appearance to be a much more important occurrence than the discovery of the planet Uranus, or than if astronomers, to the catalogue of stars already known, had added thirty thousand new ones.

Amidst these expectations and honors, a few circumstances were either unknown or overlooked, calculated to raise great doubts of Peter's fitness for such high destinies, and to produce an unpleasant suspicion that he had not entirely escaped the contaminating influence of civilized life.

When he was first met with, a small fragment of a shirt hung about his neck; and the whiteness of his thighs, compared to his brown legs, proved that he must have worn breeches, but not stockings. His tongue was very large, and little capable of motion; so that an army surgeon at Hameln thought of attempting to set it free by cutting the frenum; but did not perform the operation. Further, some boatmen, in descending the Weser, had seen at different points on the banks of the river, a poor naked boy, and had given him something to eat; and, lastly, it was ascertained that a widower at Luchtringen had had a dumb child; who, having been lost in the woods in 1723, returned home again; but, on his father's second marriage, was driven out again by his stepmother.

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* "I consider his history as a brief chronicle or abstract of the history of the progress of human nature, from the mere animal to the first stage of civilized life."*Ancient Metaphysics*, v. iii. p. 57.

Dr. ARBUTHNOT soon found out that no brilliant discoveries in psychology or anthropology could be expected from the case of this poor idiot: he was therefore placed with a farmer in Hertfordshire, where he continued to live, or rather vegetate, till 1785.

PETER was of middle size, somewhat robust in appearance, and strong, and had a respectable beard. He took the ordinary mixed diet, retaining his early fondness for onions. He liked warmth; and relished a glass of brandy. He always showed the most perfect indifference to the other sex.

He could not be taught to speak; the plainest of the few articulate sounds he could utter were *Peter*, *ki sho*, and *qui ca;* the two latter being attempts at pronouncing King George and Queen Caroline. He had a taste for music, and would hum over various airs that he often heard: when an instrumental performance took place, he would jump about with great delight till he was quite tired. He was deficient in one important privilege of our nature; having never been seen to laugh.

He was a harmless and obedient creature, and could be employed in little domestic offices, or in the fields, but not without superintendence. Having been left to himself to throw up a load of dung into a cart, as soon as he had executed the task, he jumped up, and set to work as diligently to throw it all out again. Having, on one occasion, wandered away from home as far as Norfolk, at the time when great alarms existed about the Pretender and his emissaries, he was brought before a justice of peace as a suspicious character; and making no answer to any interrogatories, was deemed contumacious, and sent to prison. A fire broke out in the night; when he was found sitting quietly in a corner, enjoying the light and warmth very much, and not at all willing to move.

Such was this famous representative of unsophisticated human nature!

Although PETER was little capable of filling that high situation, his history affords a striking and useful caution, by exhibiting the uncertainty of human testimony and historical evidence. No two accounts agree in the year, season, and place of his discovery; and later printed histories contain serious narratives of GEORGE I. having found him in hunting at Herrenhausen, or in the Harz;

that it was necessary to cut down the tree, in the top of which he had taken refuge; that his body was covered with hair, and that he ran on all fours; that he jumped about trees like a squirrel, knew how to get bait out of traps placed for wolves; that he was carried over to England in an iron cage, learned to speak in nine months at the court of the Queen, was baptised at the house of Dr. ARBUTHNOT, and soon after died, &c. &c.

PETER was as upright in his attitude, and as invariably biped, as any of ourselves; and the same remark holds good of all the other authentic examples; as of the girl described by CONDAMINE,[*] a man found in the Pyrenees,[†] and the boy,[‡] met with near Aveyron, and brought to Paris soon after the Revolution. On the other hand, where they have been described as going on all fours, suspicious circumstances occur in the narration, calculated to throw discredit on the whole. Such is the case with LINNEUS's juvenis *ovinas* Hibernus, taken from TULPIUS, *Observat Medicar*. lib. iv. cap. 9. He is said to have been brought up " inter oves sylvestres," and thence to have acquired " natura ovilla :" he is described further as " ferox ac indomitus vultu truci," &c.

An unprejudiced examination of all these cases, putting aside what is obviously exaggerated or fabulous, proves that they are merely instances of defective organization; mal-formed individuals incapable of speech, and exhibiting few and imperfect mental phenomena; pathological specimens, therefore, rather than examples of human perfection. Nothing can be conceived more widely removed from the natural condition of man, than these half-witted beings; and we might as rationally adopt any monstrous birth for a model of the human form, as set them up for a standard of the attitude, progression, or faculties of man.

But if these beings had been free from defect, if they had been well-formed, and capable of all human endowments, should we deem them more *natural* for having been solitary ? should we not, on the contrary, be justified in regarding that insulated condition as a deviation from the scheme of nature, comparing it, with

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[*] *Histoire d'une jeune Fille Sauvage*, 12mo. Paris, 1761.

[†] LEROY *Exploitation de la Nature dans les Pyrenees*; 4to. 1776, p. 8

[‡] *Historical Account of the young Savage of Aveyron*, 12mo.

Voltaire, to the state of a bee which has lost the hive?* Is the social rook or antelope more artificial or degenerate than the solitary eagle or lion?

If the erect attitude and biped progression be peculiar to man, the structure of the lower limbs, which support his trunk, and of their muscles, which move it, must exhibit characters of form, size, and arrangement, which are met with in no other animals. The influence of this peculiarity will not be confined to the lower limbs: it will also modify the pelvis, which is the basis of the trunk; receiving above the weight of the abdominal viscera, the thorax, upper limbs, and head, transmitting this weight to the lower limbs, and offering fixed points for their motions: the upper limbs, which are not employed for support, but merely as instruments of prehension; the thorax, by which these are separated, and on which they rest; and the junction of the head with the vertebral column, on which the due support of this weighty mass, and the proper direction of the eyes, mouth, and face depend.

The length and strength of the lower limbs, the great instruments of support and progression, are very striking, and quite peculiar to man. They are equal in length to the trunk and head together; which is not the case in any other animal, excepting the kangaroo, jerboa, &c. where the principles of construction and the offices of these parts are quite different from the human.

In all the monkey tribe, they fall very far short of this proportion: even in the orang-utang and chimpansé they are short and weak, and manifestly inadequate to sustain the body erect. This circumstance alone effectually disqualifies the most manlike monkey from participating with man in that grand attribute; and would of itself be a sufficient ground for specific distinction be-between the two beings. If the lower limbs of monkeys are weak in comparison with the human, those of other animals, and particularly of true quadrupeds, are much more so: the short thigh-bone is almost concealed by the muscles of the body; and the rest of the limb is slender, and not covered by any great muscular masses.

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* "Si l'on rencontre une abeille errante, devra-t-on conclure que cette abeille est dans l'état de pure nature, et que celles qui travaillent en société dans la ruche ont dégénéré?"

The disproportion in the respective lengths of our upper and lower limbs, clearly points out the different offices they are destined to execute. The superior length and power of the latter, so necessary for the various purposes connected with our erect attitude, make us altogether unfit for going on all-fours, as will be immediately shown by a trial. In such an experiment, either the lower limbs must be thrown obliquely backwards, or the articulations held in a bent and very insecure position. Even children, before they can walk, in whom the lower limbs are comparatively shorter than in adults, crawl upon their knees, or else drag the lower extremities after them on the ground.

To the long and powerful femur, to the strong tibia, to the broad articular surfaces which join these at the knee, no parallel can be met with in any animal.

The breadth of the human pelvis affords an ample basis of support for the trunk; and this receives a still further transverse enlargement by the length of the cervix femoris, another peculiarity of human organization. This long neck throws the body of the bone outwards, disengages its shaft from the hip-joint, and thus increases the extent of rotation: it gives the body greater firmness in standing, without impeding progression; since the head of the bone, and not the body, is the centre of motion. If the thigh-bones possessed no neck, but were kept equally far apart by increasing the distance between the cotyloid cavities, the attitude of standing would be just as secure, the transverse base of support being still the same; but progression would be impeded, as it actually is in the female, from the greater transvers diameter of the pelvis.

Another character of the human femur is the obliquity of its shaft, and superior length of the internal condyle, arising from the breadth of the pelvis, and length of the cervix, combined with the necessity for bringing its lower end perpendicularly under the pelvis, in reference to the secure support of the trunk.

The line of direction of the human femur is perpendicular, the same as that of the trunk; its axis coincides with the centre of gravity of the body : it is placed perpendicularly under the pelvis, and thus supports the trunk steadily. In all other animals it forms an angle with the spine; and this is often even an acute one. It is obvious that the erect attitude must be extremely unsteady, and the difficulty of maintaining the body in equilibrio very great in such an arrangement. When the vertebral column is raised perpendicularly in the orang-utang, the thigh-bones form an obtuse angle with it: the long arms preserve the balance, as they do likewise in the gibbon (S. Lar.) The angle is increased in quadrupeds under similar circumstances; and the efforts they make to remain upright on the hind feet are continued with difficulty, more especially if not assisted by some other advantages of construction, as in the bear, for instance, by the length of the heel.

The feet, being the ultimate supports of the whole frame, and the primary agents of locomotion, are characterized by a combination of greater breadth, strength, and solidity, in proportion to the size of the body, than those of any animal. The whole surface of the tarsus, metatarsus, and toes, rests on the ground, and the os calcis forms a right angle with the leg. The two last circumstances are seen in no other animal: even the simiæ and the bear have the end of the os calcis raised, so that this bone begins to form an acute angle with the leg: the dog, the cat, and other digitated quadrupeds, even the elephant himself, do not rest on the tarsus or carpus, but merely on the toes : the cloven-hoofed ruminants (bisulca), and the solipeda, touch the ground merely with the extremities of the third phalanges, and the os calcis is raised nearly into a perpendicular position. Thus as we depart from man, the foot is more and more contracted and enlongated, the part serving for support reduced, and the angle of the heel-bone rendered more acute.

The great size of the os calcis, and particularly the bulk and prominence of its posterior projection, to which the powerful muscles of the calf are affixed, correspond to its important office of supporting the back of the foot, and resisting force applied to the front of the body. This single bone is, therefore, an infallible characteristic of man; and "Ex calce hominem," would probably be a safer rule than "Ex pede Herculem."

The concavity of the sole is an arrangement rendered necessary by the whole surface resting flat on the ground. It provides room for the muscles, nerves, vessels and tendons of the toes It also assists the functions of the foot, by enabling it to gain a kind of hold of the bodies on which it rests, and to accommodate itself to unequal surfaces; an advantage almost destroyed by the use of shoes, but eminently conspicuous in those people whose feet are not cramped by artificial means of defence.

The gradually-increased breadth of the foot towards the front, the predominance of its solid and nearly immoveable parts, the tarsus and metatarsus over the more flexible toes, the direction of the metatarsal bone supporting the great toe, its situation and want of mobility, are circumstances of strong contrast with the structure of the hand; plainly pointing out the former as organized for strength and resistance, and adapted to increase the extent and solidity of its support.

A further argument to the same effect may be drawn from the comparative progress of ossification in the two members. The bones of the tarsus, and particularly the os calcis, ossify at an earlier period, and advance more rapidly in their development than those of the carpus: very little strength of hand is required in the first years of life: while the feet, at the end of twelve months, begin to be employed in sustaining the body, and advancing it by progressive motion.

The lower limbs can be separated more widely in man than in any animal, in consequence of the great breadth of the pelvis, and length of the cervix femoris. Thus we are enabled to derive the full advantage from those admirable instruments of support, the feet; an advantage which may be estimated by observing the varied motions, the rapid changes, and multiplied combinations of movement, according to the probable direction of the expected impulse, in boxing, wrestling, and other similar feats of activity, in pushing, pulling, &c. &c.

In all the particulars just described, we see a strong contrast between man and the nearest or most anthropomorphous animals.

even the monkey and orang-utang. In the latter, the cervix femoris is short, the thigh-bone straight, and its two condyles of equal length.* The foot rests on its outer edge, the heel not touching the ground; the tarsus is contracted, and the digital phalanges lengthened, so that in these respects it resembles a hand.†

The peculiarities of the human pelvis coincide with those of the lower limbs. The form of this part is very characteristic in man, and distinguishes him from the simiæ, and indeed from all other mammalia. It might be asserted, that the human skeleton alone has a proper *pelvis;* that is, such an incurvation of the sacrum and coccyx, and such an union of them with the ossa innominata, as forms a *basin*-like cavity, from which, the space included between the elongated ilia, and the straight sacrum and coccyx of monkeys, differs toto cœlo. In the orang-utang, and the elephant, we find the nearest approach to the human formation. In the former,‡ however, the upper part of the ilium is narrow and elongated, stretching upwards in the direction of the spine, and its length exceeds its breadth; so that the relations of these two dimensions are very different in man and this animal.‖ In the latter, the symphysis pubis is very deep; and in both, there is neither that incurvation of the sacrum, from the promontory downwards, nor that direction of the coccyx forwards, which, with the broad horizontal expansion of the ilia, and the shallowness of the symphysis bubis, are peculiar to the human frame, and make it a broad and firm basis for the trunk, on which the weight of the abdominal contents, and particularly of the pregnant uterus, is supported. The lower part of the sacrum and the os coccygis are turned forwards in man, and form the only firm bony resistance, in the inferior aperture of the pelvis, to the abdominal viscera, forced downwards by the diaphragm and abdominal muscles. These bones are straight in all other animals, because the weight of the viscera is differently supported. Even in the orang-utang, the sacrum is flat and contracted, and continued, together with the os coccygis, in a straight line with the vertebral column. If the human sacrum and coccyx, had been continued in a straight line with the spine, as those of the orang-utang and monkeys are, the ossa innominata remaining as at present, they would have projected beyond those bones, so as to disable us from sitting. The curve which they describe, in man only, obviates this inconvenience; and allows the pelvis to rest securely, in the sitting attitude, on the broad and strong ischiatic tuberosities.

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* Tyson, fig. 5.

† *Œuvres* de Camper, pl. II. fig. 5 & 6. Tyson *fig. cit.*

‡ Camper, *Œuvres*, pl. II. fig. 7. Tyson, fig. 5.

‖ The height of the whole pelvis, from the tuber ischii to the crista of the ilium, is: 7 in. 3 li. in man.
6 in.——in the orang-utang.
its breadth between the two anterior or spines, } 10 in. 6 li. in man
6 in. 6 li. in the orang-utang.

The influence of this structure on the direction and functions of the vagina will be considered afterwards.

The distribution, size, and offices of the muscular masses correspond to the organic arrangements of the skeleton. The latter and posterior surfaces of the pelvis give origin to the powerful glutei, of which the exterior (glutei magni), exceeding in size all other muscles in the body, and covered by a remarkable stratum of fat, form the buttocks, which, by their ample, fleshy, and convex protuberances, conceal the anus; and are accounted, both by the classical authors in natural history, as ARISTOTLE and BUFFON, and by the greatest physiologists, as GALEN and HALLER, as the chief character by which man is distinguished from the buttockless simiæ. "Les fesses," says the great historian of nature, "n'appartiennent qu'à l'espèce humain." The final cause of this prerogative has been assigned by an anatomist: "Solus homo ex omnibus animalibus commode sedet, cui carnosæ et magnæ nates contigere, et pro substernaculo pulvinarique, tomento repleto, inserviunt, ut citra molestiam sedendo, cogitationibus rerum divinarum animum rectius applicare possit."*

The use of the glutei, however, is not confined solely to what the pious SPIGELIUS has imagined; viz. the forming a cushion on which the body may be softly supported, for the purposes of divine cogitation; but they are very important agents in extending the pelvis on the thighs, and maintaining it in that state in the erect position of the trunk. In standing on both feet, the glutei magni fix the pelvis firmly behind, and counteract the natural tendency to fall forwards, which the weight of the head, the usual position of the upper limbs in front of the body, and the prominence of the abdominal viscera, impress upon the trunk. Hence, the bulk and power of these very muscles in the human subject afford a clear proof that man was designed for the attitude on two feet. The other two glutei are not essentially concerned in the attitude of standing on both feet; but they are the principal agents in supporting and balancing the trunk on one foot, by inclining the pelvis over the head of that thigh-bone, on which the body rests, so that the centre of gravity of the trunk may be in a line drawn through that lower extremity. In this case, their exertion counteracts the tendency of the trunk to fall on that side which is not supported. These muscles are employed in a similar manner in progression: the gluteus magnus balances the pelvis, while one leg is carried before the other, and brought to the ground; and the two others support the trunk laterally, while the limb of the opposite side is in the air.

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* SPIGELIUS *de Hum. Corp. Fab.* p. 9.

The gluteus magnus, which is the largest muscle of the human body, is so small and insignificant in animals, that it may be almost said not to exist. F. Cuvier observes of the orang-utang, "Les fesses ètoient presque nulles, ainsi que les mollets."* Tyson indeed asserts, of the chimpansé, that "our pigmy had buttocks or nates, as we shall see in the myology, but not so much as in man."† However, in his apparently accurate figure‡ there is no trace of them.

The extensors of the knee are much stronger in the human subject than in other mammalia; as their twofold operation of extending the leg on the thigh, and of bringing the thigh forwards on the leg, forms a very essential part in the human mode of progression. The flexors of the knee are, on the contrary, stronger in animals; and are inserted so much lower down in the tibia, even in the monkeys, than in the human subject, that the cord which they form keeps the knee habitually bent, and almost prevents the perfect extension of the leg on the thigh. Where the thigh and leg thus form an angle, instead of being continued in a straight line, the support of the body on the hind legs must be very insecure.

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* *Annales du Muséum*, v. 16. p. 47. The correctness of this remark is fully verified by the orang-utang belonging to Mr. Abel. It has neither buttocks nor calves

† *Anatomy of a Pigmy*, p. 14 ‡ F. 2.

The extensor muscles of the ankle joint, and chiefly those which form the calf of the leg, are the principal agents in progression. Hence man is particularly characterized by the largeness of his calves: and no animal equals him in this respect. By elevating the os calcis, they raise the whole body in the act of progression; and, by extending the leg on the foot, they counteract that tendency which the weight of the body has to bend the leg in standing. The muscles of the calves lift the heels, and thereby elevate the whole body, which is supported on the astragalus: the weight is thus maintained on the anterior part of the feet, and the individual is said to stand on tiptoes. If the foot of one side be lifted from the ground, and the opposite heel be raised by the calf of its own side, the whole body is then elevated by the muscles of one calf. When a person stands on tiptoe with a burden on the shoulders, or on any part of the trunk, the weight of this, as well as of the body, must be raised and supported by the muscles of the calf. In running, leaping, jumping in the air, dancing, &c. the protection of the body is accomplished by the same power.

ARISTOTLE, and others after him, have justly observed, that calves of the legs can be ascribed to man only.

The whole arrangement of the thorax corresponds to the erect attitude of man, It is flattened anteriorly, possesses a very broad sternum, is wide transversely, but shallow from before, backwards. Its lateral width and inconsiderable depth from sternum to spine, not only throw the arms far apart, and thus give a more extensive range to their motions, but diminish that preponderance of the trunk towards the front, which, although it is unimportant in the horizontal, is very inconvenient in the erect attitude. Man is said to be the only animal in which the transverse exceeds the antero-posterior diameter of the chest. Even in simia satyrus the latter exceeds the former measurement.*

The human sternum is short, as well as broad; hence a large space is left between the front of the chest and the pelvis, unprovided with bony supporters; the weight of the viscera, which are sufficiently guarded by the abdominal muscles, is securely sustained below by the ample pelvis.

Quadrupeds have a thorax compressed laterally, narrow and keelshaped on its external aspect, consequently deep from sternum to spine, but confined in the transverse dimension. This structure, with the absence of clavicles, allows the front legs to come near together, to fall perpendicularly under the front of the trunk, and support it with firmness and facility. Their sternum is long and narrow, the ribs advance nearer to the crista of the os innominatum, and together with the sternum cover a large share of the abdomen, and support its viscera more effectually in the horizontal position of the trunk. For the same purpose too, the ribs in many cases are more numerous than in man: viz thirty-two in the hyena, thirty-six in the horse, forty in the elephant, and forty-six in the unau (Bradydus didactylus.)

These, with other points, which cannot escape observation when the skeleton of any rather long-legged quadruped is compared to that of man, show how unfit he is for the attitude on all-fours, which in his case can never be otherwise than unsteady, irksome, and fatiguing in the highest degree.

The spine of man presents some important peculiarities resulting from his characteristic attitude. One of these is, its very remarkable increase of size in the lumbar region; an augmentation corresponding to that of the superincumbent weight, and to the magnitude of the efforts which this part has to sustain. The immense bulk of the sacrum,† far exceeding in proportion to the rest of the body, that of any animal, is referable to the same cause, to the mode in which this weight is transmitted to the hip-bones, and thence to the lower limbs, to the peculiar construction of the pelvis. The waving line* of the column, arising from a series of alternate curves in opposite directions, is altogether peculiar to man; it allows a proper distribution of the weight with respect to the centre of gravity, the line of which, carried through the entire trunk, must fall within the space covered by the feet, or by one foot, when we support the body on one only. As this line passes through all the curves, motion is allowed in the upper regions without impairing the general equilibrium.

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* CAMPER, *Œuvres*, p. i. 115.

† In the chimpansé, says TYSON, "the os sacrum was nothing so dilated and spread, as 'tis in man; but contracted and narrow, as 'tis in apes; and very remarkably different from the human skeleton." p. 69.

The cervical vertebræ of the monkeys, including the satyrus† and troglodytes,‡ are remarkable for the length and prominence of the spinous processes; a peculiarity probably connected with the support of the head, which preponderates in front, in consequence of the elongation of the jaws and the retreat of the occipital condyles backwards.§

I have explained how the lower extremities afford a sufficient base of support and solid columns to sustain the trunk, and how the same point is secured by the organic arrangement of the latter. The breadth of the human pelvis forms an ample basis for the body, and a firm point of action for the abdominal and other muscles, enabling them quickly to rectify the position of the parts above. In all the digitated animals, the pelvis is so narrow, that the trunk resembles an inverted pyramid: there would be great difficulty in maintaining it in equilibrio, even were it possible for the animal to assume the erect position. In those instances where the pelvis is broader, as in the hoofed animals, the other conditions of the upright stature are absent. The bear, however, forms an exception to these observations, and may be taught to stand and walk erect, although the posture is manifestly irksome to the animal. When quadrupeds endeavor to support themselves on the hind extremities, as for the purpose of seizing any object with the fore feet, they rather sit down than assume the erect position; for they rest on the thighs, as well as on the feet; and this can only be done where the fore part of the body is small, as in the simiæ, squirrel, &c. In other cases the animal is obliged to support itself by the fore feet also, as in the dog, cat, &c.

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* This is excellently represented in ALBINUS's plates of the skeleton; particularly in the side view, tab. iii. I refer to the original Leyden edition of this incomparable work; which, when the plates of the bones are added, constitutes the most accurate, useful, and splendid publication ever produced in anatomy. Its merits cannot be estimated from the English editions.

† "Les vertèbres cervicales sont remarquables par la longueur extraordinaire des apophyses épineuses des six inférieures; mais surtout par celle du milieu." "Les apophyses paroissent avoir besoin de cette longueur dans l'orang, pour qu'il puisse tenir mieux sa tête en equilibre. Je ne connois aucun autre animal dont les apophyses épineuses des vertèbres cervicales soient aussi longues, excepté le philandre d'Amérique." CAMPER, *Œuvres*, i. 126, pl. 2. fig. 3.

‡ TYSON, p. 68.

§ This great developement of the cervical spines is most remarkable in the pongo, where the enormous bulk of the jaws corresponds to it. See AUDEBERT, *Hist. Nat. des Singes et Makis*, fol. Planche Anatomique 2, fig. 5.

CHAPTER III.

On the Upper Extremities—Advantageous Construction of the Human Hand.—Man is two-handed; the Monkey Kind four-handed. — On the natural Attitude and Gait of Monkeys.

A CURSORY survey of the upper limbs will be sufficient to convince us that they are entirely unsuited to the office of supporting the body; and as well calculated for the uses to which we put them, of seizing and holding objects, and thereby executing, besides all the processes of the arts, a thousand minute but most serviceable actions of constant recurrence.

There is a general resemblance of form throughout the upper and lower extremities; their principal divisions, the number and form of the bones, and the construction of the articulations in each division, correspond very clearly; the essential varieties may all be referred to the principles of solidity and resistance in the lower, of mobility in the upper, as leading purposes of formation. A comparison of the arm, fore-arm, and hand, to the thigh, leg, and foot; of the os innominatum to the scapula; of the hip, knee, and ankle, to the shoulder, elbow, and wrist; of the carpus, metacarpus, and fingers, to the tarsus, metatarsus, and toes; will at once prove and illustrate this difference.

The scapulæ, placed at the posterior and lateral aspects of the trunk are kept wide apart by the clavicles: a line falling perpendicularly from the shoulder, in the erect attitude of the body, would pass far behind the hip: thus the upper limbs are thrown outwards and backwards, and have a free range in their principal motions, which are in the anterior direction. The glenoid cavities look outwards. The arms are widely separated above, and they diverge towards their opposite ends: the lower limbs, on the contrary, converge from above downwards. In true quadrupeds, the clavicles are suppressed ;[*] the shoulderblades brought forward on the chest, and approximated to each other; and the glenoid cavities are directed downwards. Consequently, the anterior or pectoral members fall perpendicularly under the front of the chest, and come still nearer together below than above.

The deep cup of the os innominatum, and the powerful orbicular ligament of the hip, are strongly contrasted with the shallow glenoid cavity and weak capsule of the shoulder: the difference between the broad articular surfaces and very powerful ligaments of the knee, and the strong joint of the ankle on one side, and the articulations of the elbow and wrist on the other, is equally striking.

The leg and fore-arm resemble each other less than the thigh and arm: in the fore-arm, the parts are arranged favorably to mobility; in the leg, the object is to procure a firm and solid support, which can transport the centre of gravity with ease and safety from one point to another. Of the two bones of the fore-arm, which are nearly equal in every respect, one rolls easily over the other, and the hand is articulated with the moveable bone. In the lower extremity these rolling motions would have introduced dangerous unsteadiness and insecurity. The foot therefore is articulated with the tibia, which corresponds to the ulna; and the fibula possesses no perceptible power of motion.

The principal differences in the hand and foot occur in the relation which the carpus and metacarpus, the tarsus and metatarsus—the solid or resisting portions—bear respectively to the phalanges of the fingers and toes, the flexible portions of the members. The solid part of the hand is less developed, and has far less volume than the analogous part of the foot, on which the whole weight of the body in standing finally rests: the phalanges, on the contrary, which are the principal agents in executing the functions of the hand, are much longer and stronger than those of the toes, which are not so essential to station or progression. The three phalanges of the middle finger equal in length the length of the carpus and metacarpus together; while the respective proportions of the tarsus and metatarsus and toes are about $\frac{4}{5}$ and $\frac{1}{5}$. The parts of the foot and hand are disposed inversely in respect to their importance. The posterior portion of the former, and the anterior of the latter, are of the most consequence, and possess the most remarkable characters. The functions of the hand render it necessary that its plane should be nearly continuous with that of the fore-arm; otherwise the radius could not guide it so precisely to the objects in the view. In the foot, the articulation is so disposed, that its posterior parts offer a powerful lever for muscular agents, and a solid support for the mass above: it is formed by a single bone of the foot, which adds to its solidity. The metacarpus have a much greater similarity to each other; the latter is the more solid, and offers this principal difference. The metatarsal bone of the great toe, by far the strongest of the whole, has scarcely any motion on the tarsus, and is parallel to others; while the corresponding bone of the thumb has a very considerable extent of motion, and is anterior to the rest of the metacarpus, supposing the palm to be turned directly forwards. These remarkable differences are easily understood, when we consider that the great toe, as one of the points on which the body is supported, requires solidity; while the thumb, being concerned in all the numerous and varied motions of the hand, must be organized for mobility.

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[*] It is stated, in the *Physiological Lectures*, p. 123, that "no animal, except the monkey, has a clavicle like that of man." Certainly none, without excepting even the monkey, have either clavicles, or any other bones, exactly resembling the human in all points: but many, even of the more common kinds, have clavicles equal to those of man in relative size and length as well as in office. As the use of this bone is to maintain the shoulder at its proper distance from the front of the trunk, and to prevent the scapula in particular from coming forward on the chest, it exists in all cases where the pectoral members are employed, either principally, or in great part, in executing purposes foreign to support, such as holding objects, climbing, flying, digging, raking the ground. It will be sufficient to mention that the lemurs and bats, the squirrel, beaver, rat, porcupine, mole, ant-eater, hedge-hog, shrew, and sloth, possess perfect clavicles.

The human hands being terminated by long and flexible members, of which only a small portion is covered by the flat nails, while the rest is furnished with a highly organized and very sensible integument, form admirable organs of touch and instruments of prehension. The animal kingdom exhibits no corresponding part so advantageously constructed in these respects. At the same time, the lateral attachment of the arms to the trunk, and the erect attitude, give us the freest use of these admirable instruments. So greatly does man excel animals in the conformation of the hands, that Anaxagoras asserted what Helvetius has again brought forward in our times, "that man is the wisest of animals because he possesses hands." In such a view we can by no means coincide; yet Aristotle is well justified in observing that man alone possesses hands really deserving that name. Several mammalia have also hands, but much less complete, and less serviceable than that of the human subject, which, in comparison to them, was justly enough termed by the Stagyrite the organ of all organs. The great superiority of the human hand arises from the size and strength of the thumb, which can be brought into a state of opposition to the fingers; and is hence of the greatest use, in enabling us to grasp spherical bodies, and take up any object in the hand, in giving a firm hold on whatever we seize, in executing all the mechanical processes of the arts, in writing, drawing, cutting: in short, in a thousand offices, which occur every moment of our lives, and which either could not be accomplished at all, if the thumb were absent, or would require the concurrence of both hands, instead of being done by one only. Hence it has been justly described by Albinus as a second hand, "manus parva majori adjutrix."*

All the simiæ possess hands; but the most distinguishing part, the thumb, is slender, short, and weak, even in the most anthropomorphous:† regarded as an imitation of the human structure, it would almost justify the term applied to it by Eustachius—'ridiculous.' The other fingers are elongated and slender.‡

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* *De Sceleto*, p. 465.

† The thumb of the orang-utang and chimpansé, besides being much smaller than the fingers, reaches only to the metacarpo-digital joint. Camper, *Œuvres*, pl. 2. fig. 5. F. Cuvier in the *Annales du Museum*, t. 16. p. 2. Tyson, p. 12. fig. 5.

‡ Simiæ in general have nine bones in the carpus: and Camper found the ninth bone in the orang-utang; it was a sesamoid bone in the tendon of the abductor longus pollicis. *Œuvres*, 143. He found in the same animal a large sesamoid bone in the tendon of the popliteus: ibid. 133.

Some animals, which have fingers sufficiently long and moveable for seizing and grasping objects, are obliged, by the want of a separate thumb, to hold them by means of the two fore-paws; as the squirrel, rat, opossum, &c. Those which are moreover obliged to rest their fore-feet on the ground, as the dog and cat, can only hold objects by fixing them between the paw and the ground. Lastly, such as have the fingers united by integuments, or enclosed in hoofs, lose all power of prehension.

The comparison, which I have already drawn between the construction of the hand and foot, having shown that the latter is merely calculated for support in man, we may state that he is two-handed and two-footed, or bimanous and biped.

Monkeys, apes, and other anthropo-morphous animals, can, in fact, be called neither bipeds nor quadrupeds; but they are quadrumaneous or four-handed.[*] They have opposable thumbs on the lower as well as upper extremities; and thus their feet are instruments of prehension as well as their hands.

By a thumb we mean a member not placed in a direction parallel to the fingers, but standing off from them laterally, enjoying separate motion, and therefore capable of being brought into opposition to them, as in grasping or prehension. A great toe, in its direction, articulation, and extent of motion, corresponds entirely to the other toes; whereas the joints and muscles must be altogether different in a thumb. It is hardly necessary to point out how unfit the human feet are for all purposes of prehension: but the hind limbs of the simiæ really deserve the name of hands more than the front; and are more advantageously constructed for holding. This hind thumb is so characteristic, that it is found in certain simiæ which have either no fore thumb, or only a rudiment of it.[†]

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[*] Aristotle observed that the feet of monkeys, resemble hands; and Tyson, in describing the foot of the chimpanse (S. troglodytes) says, "But this part, in the formation and its function too, being liker a hand than a foot, for the distinguishing this sort of animals from others, I have thought, whether it might not be reckoned and called rather *quadrumanus* than *quadrupes*: i. e. a *four-handed*, than a *four-footed animal*." p. 13.

[†] M. Geoffroy has placed together the simiæ thus circumstanced in a new genus, which he calls atèles (imperfect) *Annales du Muséum*, t. 7. et 18. In

We may now answer the question, whether the orang-utang and other simiæ go erect, or on all-fours; they do neither, but live chiefly in trees, for which they are admirably adapted by having prehensible members, instruments for grasping and holding, on both upper and lower extremities. Hence CUVIER calls them "les grimpeurs par excellence."* They live in trees, and find their food in them: they can hang by one fore or hind leg, employing the remaining members in gathering fruit, or in other offices. Those which have less perfect hands are furnished with prehensile tails, by which they can be more securely supported in trees.

It is hardly necessary to add, that when we see monkeys walking erect, it must be ascribed to instruction and discipline. The delineations of the orang-utang and chimpansé taken from the life, show how unnatural and inconvenient the erect posture is to them: they are drawn with the front hands leaning on a stick, while the posterior ones have the toes bent like a clenched fist.†

The circumstances in the structure of the monkey kind, which render them unsuited for the erect attitude, have been already in part explained; viz. the narrowness of the pelvis, the short and weak lower limbs, the angle formed by the thigh at its junction with the trunk, and that between the leg and thigh, the small size of the muscles composing the buttocks and calves, and the slight prominence of the os calcis, which bone does not come to the ground. It may be added, that the exterior margin of the foot chiefly rests on the ground in the simiæ; which circumstance, while it leaves them a freer use of their thumb and long toes in

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the chamek (atèles pentadactylus) there is a single phalanx, without a nail, and very slightly prominent. The coaita (S. paniscus L. Atèles paniscus GEOFF.) has absolutely no visible thumb

* *Leçons d'Anatomie comparée*, t. 1, p. 493. From the agility which the orang-utang at Exeter-Change exhibits, in moving along the ropes suspended in his apartment, and swinging himself from one part to another, he seems strictly to deserve the denomination of a climbing animal.

† See VOSMAER'S figure as copied by BLUMENBACH, *Abbild. n. h. Gegenstände*, No. 12. TYSON, fig. 1 & 2. The sitting attitude of Mr. ABEL'S figure, in which the extremities are all gathered up to the trunk, is much more natural than the erect position in which the monkey tribe are often represented.

seizing the branches of trees, renders the organ so much less adapted to support the body on level ground. The plantaris muscle, which is very fleshy in the monkey kind, instead of terminating, as it does in man, by insertion in the os calcis, passes over that bone into the sole, and is there connected with the plantar aponeurosis and flexor perforatus, so that it may be regarded as making a part of both.* In other quadrupeds it holds the place of the flexor perforatus, entering the foot over the os calcis. These arrangements are quite incompatible with the erect attitude, as the tendon would be compressed, and its action impeded, if the heel rested on the ground. The thumbs, both of the fore and hind hands, have no separate flexor longus in the monkeys, but receive tendons from the flexors of the other fingers.† Hence, the thumbs in these animals will generally be bent together with the other fingers; and they are less capable of those actions, in which the motion of the thumb is combined with that of the fore and middle finger, a combination so important in numerous delicate operations.

It is rather singular, since persons have been found to contend that man ought to go on all-fours, that there should have been others who undertake to prove that the oraug-utang, and the monkey tribe in general, have an organization suited to biped progression. Even BUFFON states that one, which he saw, always went on two feet: and he ascribes the erect attitude to him without any hesitation. No doubt he can sustain this posture for some time, and in the unnatural condition of confinement he may frequently sit: hence, perhaps, we may account for the numerous observations, in which he is said to go erect. But the circumstances of structure already explained show clearly that he is not calculated, like man, for that attitude: and we find, in some of the most authentic accounts, that he is said to have gone on all-fours. ALLAMAND, who saw a simia satyrus in Holland, gives the following account of its motions and attitudes: "Its usual attitude was sitting, with its thighs and knees raised: it walked nearly in the same posture, its rump being very near the ground.

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* VICQ D'AZYR, Discours sur l'Anatomie, *Œuvres*, t. 4. p. 149.

† See the work above quoted.

I never saw it perfectly upright, except when it wished to reach something: and even then its knees were always a little on the bend, and it tottered."* Vosmaer, who has described the same individual, says, "This animal generally walked on all-fours, like the other monkeys: but it could, likewise, walk on its hind feet, and provided with a stick, it would often support itself for a considerable time. However, it never used its feet flat on the ground, as a man would do, but bent backwards in such a manner, that it supported itself on the external edge of its hind feet, with the toes drawn inwards, which denotes a posture for climbing trees."† The testimony of Camper concerning one which lived for some time in the ménagerie of the Stadtholder, at Petit Loo, is to the same effect: "L'orang vivant couroit à quatre pattes, et lorsqu'il se tenoit debout, (ce qu'il fit le plus dans les premiers tems de son arrivée et lorsqu'il jouissoit encore de toute sa vigueur) il tenoit les genoux ployés."‡ The description of the individual observed by F. Cuvier corroborates these observations; he climbed excellently, but walked as imperfectly. In the latter operation, he rested his closed hands on the ground, and dragged forwards his hind parts. If one hand was held, he could walk on his feet, but then he supported himself by resting the other hand on the ground. The outer edge of the foot alone touched the ground; and the toes were bent.§ This description will apply in all points to the orang-utang brought from Batavia by Mr. Abel;|| and a short observation of his customary attitudes and motions will convince any one that he is not organized for biped progression, nor capable of it, even for a short trial, without a troublesome and painful effort.

The bent knees and general attitude of the figure represented by Tyson, show that the chimpansé is not a biped: "Being weak," says the author, "the better to support him I have given him a stick in his right hand."¶ Several passages show that the

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* Buffon, by Wood; v. 10. p. 79. † Ibid. p. 84.

‡ "Œuvres," t. 1. p. 60.

§ "Annales du Muséum", v. 16. 49.

|| "Narrative of a Journey in China," p. 322, and following.

¶ P. 16. pl. 1.

animal often went on all-fours; and thus confirm the representation given by the directors of the Sierra-Leone Company,* who say, in describing a young one, that "at first he crawled on all-fours, always walking on the outside of his hands; but, when grown larger, he endeavored to go erect, supporting himself by a stick, which he carried in his hand."

That the gibbon (S. Lar.) another of the anthropo-morphous simiæ, is not constructed for the erect attitude, appears from the testimony of Daubenton.† It could go almost erect on the feet, but the legs and thighs were rather bent; and sometimes the hand touched the ground, to support the reeling body: it was unsteady, whenever it stopped in an upright posture, the heel only resting on the ground, and the sole being raised: it remained but a short time in this attitude, which appeared unnatural.

No instance has ever been produced of a monkey, nor indeed of any animal except man, which could support the body in equilibrio on one foot only. The causes of this prerogative of the human organization will be found in the breadth of his foot, in the resting of its entire surface on the ground, in the bony and muscular strength of the lower extremity, and the length of the cervix femoris.

The foregoing considerations render it very clear that the erect stature is not only a necessary result of the human structure; but also, that it is peculiar to man; and that the differences in the form and arrangement of parts, derived from this source only, are abundantly sufficient to distinguish man by a wide interval from all other animals. The assertion of Linnæus,‡ "Dari simias erecto corpore binis æque ac homo pedibus incedentes, et pedum et manuum ministerio humanam referentes speciem," is not only unsupported by any authentic testimony concerning animals of the monkey kind, but directly contradicted by all the well ascertained facts relating to those which most nearly resemble us in stature.

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* P 164.

† Buffon, by Wood, v 10. p. 86.

‡ "Fauna Suecica;" Præfat.

CHAPTER IV.

Comparison of the Human Head and Teeth to those of Animals.

When we consider that the head affords a receptacle for the organ of the mind, that it lodges the principal external senses, as well as the instruments for procuring, receiving, masticating, and swallowing the food, and a considerable part of the apparatus employed in producing sound, we shall not be surprised at the striking differences in its construction, at those proportional developements or contractions of its several parts which determine the faculties and endowments of different animals, and their relative rank in the scale of nature. The most convenient position for this important assemblage of organs—including the chief means by which we are connected, actively or passively, with the external world—must exhibit corresponding varieties. A situation is required, combining firmness of support with freedom of motion, a ready communication of the senses with their appropriate external objects, and a corresponding arrangement of the entrances to the respiratory, digestive and vocal cavities. The mode in which the entire mass is articulated and supported must therefore be varied according to the predominance or contraction of the various particular organs, as well as in conformity to the attitude of the animal, and the distribution of other parts, particularly the upper limbs. As the proportions of its parts in the human subject indicate a predominance of the organ of thought and reflection over the instruments employed in external sensation and the supply of merely animal wants, which places man at the top of the intellectual scale; so the position of the whole, and the arrangements for its support and motion, are calculated, like all the details of organization hitherto examined, in reference to his peculiar distinction of the erect attitude.

A very striking difference between man and all other animals consists in the relative proportions of the cranium and face; which are indicated in a general, but not very accurate manner, by the facial line.

The organs which occupy most of the face are those of vision, smelling, and tasting, together with the instruments of mastication and deglutition. In proportion as these are more developed, the size of the face, compared to that of the cranium, is augmented. On the contrary, when the brain is large, the volume of the cranium is increased in proportion to that of the face. The nature and character of each living being must depend on the relative energy of its animal propensities and functions, its feelings and mental powers; its leading traits will be derived from those which are most predominant. This is sufficiently evinced in the human species; but the differences observable between one man and another are fewer and less strongly marked than those which occur between animals of different species.

The brain being the organ by which the impressions on the external senses are combined and compared, in which all the processes called intellectual are carried on, we shall find that animals partake in a greater degree, or at least approach more nearly to reason, in proportion as the mass of medullary substance forming their brain exceeds that which constitutes the rest of the nervous system; or, in other words, in proportion as the organ of the mind exceeds those of the senses. Since, then, the proportions of the cranium and face indicate those of the brain and of the principal external senses and instruments of mastication, we shall not be surprised to find that they point out to us, in a great measure, the general character of animals, the degree of instinct and docility which they possess:—hence the study of these proportions is of high importance to the naturalist. Man combines by far the largest cranium, with the smallest face: and animals deviate from these relations in proportion as they increase in stupidity and ferocity.

One of the most simple (though often insufficient) methods of expressing the relative proportions of these parts is by the course of the facial line, and the amount of the facial angle. Supposing a skull to be observed in profile, in the position which it would have when the occipital condyles are at rest, in the articular hollows of the atlas, in the erect attitude of the body, and neither inclined forwards nor backwards,—a line drawn from the greatest projection of the forehead to that of the upper maxillary bone, follows the direction of the face, and is called the *facial line;* the angle, which this forms with a second line, continued horizontally backwards, is the *facial angle*, and measures the relative prominence of the jaws and forehead.* In man only is the face placed perpendicularly under the front of the cranium; so that the facial line is perpendicular; hence the angle formed between this line and the horizontal one above described is most open, or approaches most nearly to a right angle, in the human subject. The face of animals is placed in front of the cranium instead of under it: that cavity is so diminished in size, that its anterior expanded portion or forehead is soon lost, as we recede from man. Hence the facial line is oblique, and the facial angle is acute; and it becomes more and more so as we descend in the scale from man; in several birds, most reptiles and fishes, it is lost altogether, as the cranium and face are completely on a level, and form parts of one horizontal line.

The idea of stupidity is associated, even by the vulgar, with the elongation of the snout; which necessarily lowers the facial line, or renders it more oblique; hence the crane and snipe have become proverbial. On the contrary, when the facial line is elevated by any cause which does not increase the capacity of the cranium, as in the elephant and owl, by the cells which separate the two tables, the animal acquires a particular air of intelligence, and gains the credit of qualities which he does not in reality possess. Hence the latter animal has been selected as the emblem of the goddess of wisdom: and the former is distinguished in the Malay language[*] by a name which indicates an opinion that he participates with man in his most distinguishing characteristic, the possession of reason.

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* See CAMPER "Kleinere Schriften;" t. 1. pt. 1. page 15. "Hist. Nat. de l'Orang-utang;" Ch. VII. pl. 1. fig. 3. "Dissertation Physique sur les Différences réelles que présentent les Traits du Visage, &c." 4to. Utrecht, 1791. The course of the horizontal line, and its point of contact with the facial line, are by no means uniform in all the figures represented by CAMPER.

The invaluable remains of Grecian art show that the ancients were well acquainted with these circumstances. They were aware that an elevated facial line, produced by a great developement of the instrument of knowledge and reflection, and a corresponding contraction of the mouth, jaws, tongue, nose, indicated a noble and generous nature. Hence they have extended the facial angle to 90° in the representation of legislators, sages, poets, and others, on whom they wished to bestow the most august character. In the statues of their heroes and gods they have still further exaggerated the human, and reduced the animal characteristics; extending the forehead over the face, so as to push the facial line beyond the perpendicular, and to make the angle 100°.

The facial angle[*] in the human subject varies from 65° to 85°, speaking of the adult; for in the child it reaches 90°. The former is a near approach to the monkey race: the angle may be extended beyond the latter, as the Greeks have done in their representations of the Deity: here, however, 100° seem to be the *ne plus ultra;* beyond which the proportions of the head would

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[*] Outline engravings of several human heads and skulls, as well as of a monkey, and an orang-utang, in profile, with the lines measuring their facial angles, are subjoined to CAMPER'S *Dissert. Physique.* Some are also given in AUDEBERT, *Hist. Nat. des Singes;* pl. anat. 2.

The practical application of this measurement is much less extensively useful and important than CAMPER had imagined. It merely affords a striking general view of the great characteristic difference between man and some animals, without indicating to us the diversities of the human species itself, and much less those of animals. In many of the latter, indeed, it does not measure the prominence of the brain, but that of the frontal sinuses or nose. In man and the quadrumanous animals, the sinuses are inconsiderable; but in the carnivora, the pig kind, some ruminants, and particularly in the elephant, they are very large, and raise the facial line to a degree far beyond what the convexity of the brain would do. In the rodentia and the walrus the nose is very large, and throws back the cranium so that it offers no point for measurement in front.

The following is a statement of the angle in certain animals, taken by draw-appear deformed. That angle, according to **Camper**, constitutes the most beautiful* countenance; and hence he supposes the Greeks adopted it. "For," says he, "it is certain no such head was ever met with, and I cannot conceive any such should have occurred among the Greeks, since neither the Egyptians, from whom they probably descended, nor the Persians, nor the Greeks themselves, ever exhibit such a formation on their medals, when they are representing the portrait of any real character. Hence

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ing a line parallel to the floor of the nostrils, and another from the greatest prominence of the alveoli to the convexity of the cranium, without regarding the outline of the nose and face.

Young orang-utang - -	67°	Camper states it at 58° *(Diss. Phys.* pl. 1. f. 2.*)* Mr. Abel at 57°. *(Journey in China*, p. 322.) In the skull belonging to the Hunterian Collection, when the facial line is drawn from the forehead, the angle is 56°; when from the prominent superciliary ridge, 60°.
Sapajou - - - - -	65°	
Guenon - - - - - -	57°	
Mandrill - - - -	42—30°	
Coati - - - - - -	28°	
Pole-cat - - - - -	31°	
Pug-dog - - - - - -	35°	
Mastiff—line drawn from outer surface of cranium - -	41°	
———, inner - - - - -	30°	
Hare - - - - - -	30°	
Ram - - - - - -	30°	
Horse - - - - - -	23°	

Cuvier, *Leçons d'Anat. Comp*. Lec. viii. art. 1.

When the facial angles of the anthropo-morphous simiæ, as above stated, are compared to those of some Negroes,—as, for example, the skull delineated in pl. ii. which has an angle of 65°, and that in Sandifort's "Muséum Acad. Lugduno-Batavûm," Vol. I, which has nearly the same,—we find this method insufficient, even to distinguish man and animals. An American monkey, figured by Humboldt (simia melano-cephala) has as good a facial line as the generality of Negroes. "Recueil d'Obs. de Zool. et d'Anat. Comp." i. pl. 29. He ascribes to it "facies nigra, anthropomorpha, fere Æthiopis." P. 317.

* That these *unnatural* proportions may have been selected by the Grecian artists in order to convey the *preternatural* impressions associated with their notion of superior natures, and may have been well calculated to produce the intended effect, is what I can easily understand. But that proportions, which have never existed in nature, should yet constitute, in our estimation, the most beautiful (beau) countenance, appears to me, in that unqualified statement, either an unmeaning proposition, or inconsistent with any reasonable sense of the word 'beautiful.'

the ancient model of beauty does not exist in nature, but is a thing of imaginary creation: it is what WINKELMANN calls *beau idéal.*"

A vertical section of the head, in the longitudinal direction, shows us more completely the relative proportions of the cranium and face. In man, the area of the section of the cranium is nearly four times as large as that of the face; the lower jaw not being included. It is, perhaps, about three times as large in the orang-utang; twice as large in the sapajous; and they are nearly equal in the baboons and the carnivorous animals, excepting the dogs with short muzzles, such as the pug, where the cranium rather exceeds the face. In the hare and marmot the face exceeds the cranium by one third; in the porcupine and ruminants, by one half, in the pig kind, by a still greater proportion. The face is three times as large as the cranium in the hippopotamus, and nearly four times in the horse.

The human and the brute face are not more strongly contrasted in size, and in their relation to the cranium, than in general configuration, in the construction of individual parts, the motions and uses to which they are subservient. The latter is merely an instrument adapted to procure and prepare food, and often a weapon of offence and defence; the former is an organ of expression, an outward index of what passes in the busy world within. The elongated and narrow jaws, with their muscles, with their sharp cutting teeth, or strong pointed and formidable fangs, principally compose the face of the animal; the chin, lips, cheeks, eyebrows, and forehead, are either removed, or reduced to a size and form simply necessary for animal purposes. The nose is confounded with the upper jaw and lip; or, if more developed, is still applied to offices connected with procuring food. Thus we have a muzzle or snout, rather than a face. In man, on the contrary, the animal organs, the jaws and teeth, are reduced in size, and covered from view; hence the mouth is extremely small, and neither used, nor capable of use, in directly taking or seizing the aliment. The chin, lips, cheeks, bridge of the nose, eyelids, and eyebrows, receive a fullness of developement, and free play of action, which is seen in no other animal. The constant motions of this finely-formed countenance, correspond with the inward workings and emotions; and are a most important medium of influence and communication with our fellow creatures; inviting and attracting them by its expansion in love, friendship, affection, and the benevolent feelings; warning and repelling by its fearful contraction, in indignation, scorn, hatred, malice. When to the human face we add the ample and capacious forehead, the organization of the intellectual and moral being is perfect;—the contrast with all others, even of the manlike class, pointed and complete. How admirably do the positions of the face, in the erect attitude of man, and the prone posture of brutes, correspond to these striking differences in construction!

The want of the intermaxillary bone has been assigned by CAMPER as one of the grand characteristics which distinguish the human head from that of other animals.

The superior maxillary bones of the human subject are united to each other, and contain the whole of the upper series of teeth: they are, however, separated in other mammalia by a third bone of a wedge shape, which contains the incisor teeth, and was therefore called os incisivum. Since, however, this bone, is found where there are no incisor teeth, as in the horned ruminants, in the elephant, and the two horned rhinoceros of Africa, and also where there are no teeth at all, as in the ant-eater and some of the whale kind, BLUMENBACH* has bestowed on it the more appropriate name of os intermaxillare. It is a single bone in some cases; in many others composed of two symmetrical portions. It is connected to the upper jaw bone by a facial suture, running from the side of the nose to the alveolar margin, and by a palatine suture passing transversely from the alveoli to the anterior palatine foramina.

That man possesses nothing analogous to this intermaxillary bone of brutes is so clear, that we cannot easily account for that excellent anatomist, VICQ D'AZYR,† having discovered any analogy in the human jaw to the structure of quadrupeds. The only ground for such an opinion is the small transverse fissure‡ in the palate behind the alveoli of the incisors, observable in the fetus and child, and sometimes tolerably distinct in the adult. But there is this very obvious and important distinction, that no vestige of suture can ever be traced in the human subject between the alveoli, much less on the upper and anterior surface of the jaw; so that the similarity to the structure of the quadruped is very remote.

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* "De Generis Humani Varietate Nativa," p. 35.

† "Mémoires de l'Acad. des Sciences de Paris," 1780.

‡ The fissure in question is more distinct in young than in old subjects; and it is called by BLUMENBACH, 'sutura incisiva' ("Beschreibung der Knochen.")

That all mammalia, besides the human subject, possess this bone, is not so decidedly ascertained, as that man has it not. Blumenbach[*] found no trace of it in the crania of some simiæ, although all the sutures were perfect; yet it is seen in the head of the orang-utang (S. satyrus) figured by him,[†] as well as in that of Camper.[‡] On the contrary, in the head of a very anthropo-morphous simia, in the Museum of the College of Surgeons, which seems to me to be the S. satyrus, not a vestige of the sutures separating this bone is to be seen, although the individual must have been very young, as the pieces of the occipital bone are not yet consolidated. According to Tyson and Daubenton, it is not found in the chimpansé.

However the question may be decided, there can be no doubt that the crania of all the quadrumana, as well as of all other mammalia, are distinguished from the human skull by the comparative size, great length, and projection of the jaws.

Although overlooked by several modern osteologists, it was observed and accurately described by the great anatomists of the sixteenth century, Vesalius, Fallopius, and Columbus. It is also mentioned by Riolan ("Anthropographia," p. 649.) Galen has expressly enumerated an intermaxillary bone among the component parts of the human face; and Vesalius very justly inferred from this, among many equally striking proofs, that the anatomical descriptions of that author, which had been universally received with the most implicit deference till that time, had not been drawn from the examination of the human subject. This attempt to rescue mankind from error and prejudice drew upon him nothing but hatred and reproaches from his contemporaries, who were driven to the most absurd arguments in defence of their idol Galen. One of them suggested that an intermaxillary bone, though not found now, might have belonged to the human structure in former times, ("Jac. Sylvii, Depulsio Calumniarum vesani cujusdam in Galenum.")

[*] "De Gen. Hum. Var. Nat." lect. 1. § 15.

[†] "Abbildungen n. h. Gegenstände," No. 52.

[‡] "Œuvres," pl. 1. fig. 3.

The articulation of the head with the spine determines the mode of its support and extent of motion, the direction of the mouth, jaws, eyes, and rest of the face: it must, therefore, vary according to the construction and relative magnitude of its parts, as well as to the ordinary attitude of the body. The position and direction of the great occipital foramen affords a criterion of these differences.* The vertebral column being vertical in the human subject, affords a solid support for the head, which is placed nearly in equilibrio on its upper end. Hence the great occipital hole and the articular condyles are found almost in the centre of the basis cranii; and if the vertical line of the trunk and neck were continued upwards, it would pass through the top of the head; consequently the weight of the latter is sustained almost entirely by the vertebral column.

The head would be in a state of perfect equilibrium on the spine, in the erect attitude of our body, if the parts in front of the column exactly counterbalanced those behind it. This, however, is not the case.† The articular condyles are manifestly

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* "DAUBENTON sur la Difference du grand Trou Occipital dans l'Homme et dans les autres Animaux; Mém. de l'Acad. des Sciences," 1764.

† I am unfortunate enough to differ with the author of the *Physiological Lectures* in matters of fact, as much as in matters of opinion. To the following assertion I can only oppose the circumstances mentioned in the text. "The condyles are placed *so exactly parallel to the centre of gravity*, that when we sit upright, and go to sleep in that posture, the weight of the head has a tendency to *preponderate equally in every direction*, as we see in those who are dozing in a carriage. Nay, their heads sometimes revolve in a circle, like the head of harlequin on the stage." Lect. 3. The second expression marked in italics cannot be taken literally; because *inequality* is essential to *preponderance;* and an equal preponderance in every direction, if we disregard the contradiction in terms, is just equivalent to no preponderance at all. If the author means to assert that the weight behind exactly counterbalances that in front of the occipito-atloidal articulation, the easy trial of supporting a skull by the condyles will quickly show whether such a representation be correct or not.

An analogous representation occurs in the same lecture respecting the distribution of weight in the trunk of the body. "We know that, in an upright posture, the whole weight of the upper part of the body is so perfectly balanced on the base of the vertebral column, as to have an equal propensity to ponderate in every direction."

The weight of the head, of the thoracic and abdominal viscera, and the or-powerful cervical ligament.[*] This arrangement bestows on quadrupeds the power of using their jaws for seizing what is before them, of elevating them to reach what may be above the head, although the body be placed horizontally; and of touching the ground with the mouth, by depressing the head and neck as low as the feet. In several animals there is some distance between the foramen magnum and the posterior extremity of the occiput; but this interval is no where so considerable as in the human subject; and in proportion as it is increased, does the direction of the occipital foramen approach more to the horizontal one.

Animals of the monkey kind exhibit a closer resemblance of the human structure, in the position and direction of the occipital foramen, than any others. In the orang-utang it is twice as far from the jaws, as from the back of the head;[†] and it is considerably inclined downwards, so that a line drawn in its level passes below the lower jaw, instead of going just under the orbit, as in man.

The difference in the direction of the foramen may be estimated, by noting the angle formed by the union of a line drawn in the manner above mentioned, according to the direction of the opening, with another line passing from the posterior edge of the foramen to the inferior margin of the orbit. This angle is of 3° in man, and of 37° in the orang-utang; 47° in the lemur. It is still greater in the dog; and in the horse it is of 90°, or a right angle, the plane of the opening being completely vertical.

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[*] The ligamentum nuchæ or suspensorium colli, which is confounded in the *Physiological Lectures* (p. 116,) with the yellow ligaments connecting the plates of the spinous processes, is affixed at one end to the spines of the cervical and dorsal vertebræ, and at the other to the middle of the occiput, between the two fossæ cerebelli. This thick and powerful ligament affords a steady and constant support to the head of quadrupeds, which would have otherwise needed an immense mass of muscles to sustain it. Such a structure is not required in man, where, if this ligament can be said to exist at all, it is only as a weak and insignificant rudiment. I do not know how the orang-utang and other monkeys are circumstanced in this respect. Camper, however, states, that the spinous processes of the cervical vertebræ are very long in the orang-utang (*Œuvres*, i. p. 126.) And the same circumstance is still more remarkable in the skeleton of the pongo of Batavia, whose enormous jaws and face must require the support of a suspensory ligament, probably attached in both animals to the cervical spines. Audebert, *Hist. Nat. des Singes*; pl. anat. 2.

[†] The effect of this structure in throwing the centre of gravity forwards, and thus increasing the difficulty of maintaining the erect position, is particularly pointed out by Mr. Abel; *Journey in China*, p. 322.

The distance of the foramen magnum from the front of the jaws and the posterior surface of the occiput may be in man respectively, as $\frac{3}{5}$ and $\frac{2}{5}$, or even more nearly equal: the former is twice as great as the latter in the orang-utang; while, in almost all other mammalia, the opening is at the very posterior aspect of the skull.

The teeth of man are distinguished by being all of one length, and by the circumstance of their being arranged in an uniform, unbroken series. The cuspidati are a little longer than the others at first; but their sharp points are soon worn down to a level with the rest. In all animals the teeth of different classes differ in size and length, often very considerably; and they are separated by more or less wide intervals: this is particularly the case with the teeth called canine, or cuspidati, which are long, prominent, and distinct from the neighboring teeth; their not projecting beyond the rest, nor being separated from them by any interval, is, therefore, a very characteristic circumstance in the human structure. Even in the simia, whose masticatory apparatus most nearly resembles that of man, the cuspidati are longer, often very considerably longer, than the other teeth; and there are intervals in the series of each jaw to receive the cuspidati of the other.

The inferior incisors are perpendicular; the teeth, indeed, and the front of the jaw are placed in the same vertical line. In animals, these teeth slant backwards, and the jaw slopes backwards directly from the alveoli; so that the full prominent chin, so remarkable a feature in the face of our species, is found in no animal, not even in the orang-utang: it appears as if the part were cut off.

The obtuse tubercles of the grinders are again very peculiar and characteristic: they are worthy of particular remark, because, being the great instruments of dividing the food, they correspond to the kind of nourishment which the animal naturally takes. Their surface does not resemble the flat crowns with rising ridges of intermixed enamel belonging to our common herbivorous animals; nor are they like the cutting and tearing grinders of the carnivora: but they are well adapted to that mixed diet prepared by the arts of cookery, which man has always resorted to, when he could get it, and when his natural inclinations have not been thwarted by the interference of religious scruples or prohibitions, nor opposed by his own whims and fancies.

The lower jaw of man is distinguished by the prominence of the chin, a necessary consequence of the inferior incisors being perpendicular: by its shortness,* and by the oblong convexity and obliquity of the condyles.

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* The length of the inferior maxilla is one-fourth of that of the trunk from the vertex to the anus, in the simia satyrus; it is one seventh in man.

The elephant is equally remarkable with man for the shortness of the lower jaw, of which a considerable portion projects in front of the teeth. This cannot properly be deemed a chin. The incisors and cuspidati do not exist in the lower jaw of this animal: the projection in question is the part, which, in other cases, is occupied by those teeth.

CHAPTER V.

Differences between Man and Animals, in stature, proportions, and some other points.

The height of the whole body, and the proportions of its several parts, afford important points of comparison in examining the specific differences between man and the most anthropo-morphous simiæ.

The difference of stature is remarkable. Of the orang-utangs or chimpansés hitherto brought into Europe, none has been more than three feet high; and most of them have been several inches under that height. The individual brought to England by Mr. ABEL, and now at Exeter Change, is thirty-one inches.[*] Of eight seen by CAMPER,[†] none exceeded two feet and a half (Rhynland measure :) from observing the state of the teeth, and progress of ossification, and estimating, according to the human subject, the additions which the stature might be expected to receive, he thinks that their adult height may be set down at four feet of the same measure. F. CUVIER[‡] makes it considerably less. Yet they are spoken of, on the faith of travellers, as being five or six feet high, or even more: what is said of their erect gait, and many other particulars, is probably of equal accuracy.

TYSON's chimpansé measured twenty-six inches from the vertex to the heel.[||]

The great length of the upper limbs, the predominance of the fore-arm over the upper-arm, the shortness of the lower limbs, and the great length of the hands and feet, are other striking characters of the monkey kind.

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[*] *Journey in China;* 322.

[†] *Œuvres;* i. 51.

[‡] *Annales du Muséum;* xvi. 51.

[||] *Anat. of a Pygmie;* 15.

The span of the extended arms in man equals the height of the body: it is nearly double that measure in the anthropo-morphous monkeys. Our upper arm is longer than the fore-arm by two or three inches; in the last mentioned animals, the fore-arm is the longest. In us, the hip-joint divides the body equally; the lower extremity is less than half the height of the body in monkeys. The proportion of the hand and foot to the body is much greater in them than in us; the excess arising from increase in the length of the phalanges. That all these circumstances are very suitable to the climbing habits of the monkey-race, is too obvious to require particular elucidation.

In the following table, I have arranged in parallel lines the dimensions of some of a male skeleton, of the orang-utang measured by CAMPER, of that described by Mr. ABEL, and of TYSON's chimpansé:—

	Man. Inches.	Simia Satyrus. Camper.	Abel.	Simia Troglodytes.
The whole body from the vertex to the heel	71	Uncertain, but less than 30	31	26
Upper extremity	32	24½	25	17
Lower	39	16	13	12
Humerus	13	8½	9	5
Fore-arm (ulna)	9⅞	9	10	Ulna 5 Radius 5½
Hand	8¼	7	$6\frac{7}{10}$	5½
Thumb	4¼	1¼		1¼
Middle finger	4¼	3		2½
Femur	20	7		
Tibia	16¾	7		
Foot	10½	7½	8½	5¾
Middle toe	2¼	2¾		1½

In a monkey of two feet two inches the humerus measured four and a quarter, the ulna five inches.

The upper extremities of the pongo[*] of Borneo reach to the ankles, when the animal is erect: its ulna, in the College Museum, is 15¾ inches long; the whole height certainly not exceeding five feet. The man, whose gigantic skeleton is preserved in the same place, was eight feet four inches: the ulna, however, is only 13¾ inches.

The upper limbs of the gibbon touch the ground when the animal is erect.

Passing over some circumstances of less importance, ordinarily enumerated among the distinctive characters of man, as the lobules of the ear, the tumid lips, particularly the inferior, &c., I have a few remarks to make on the smoothness of the human integuments. "Dantur," says LINNEUS,[†] "alicubi terrarum, simiæ minus quam homo pilosæ:" but he does not tell us in what part of the world they are to be found. The unanimous reports of all travellers, as well as the specimens of such animals exhibited in Europe, prove incontestably that the manlike simiæ, whether the orang-utang of Borneo, or chimpansé of Angola, as well as the long-armed monkey or gibbon, are widely different from the human subject in this respect. Although the individuals brought into these countries have been under the adult age, and generally very sickly, their body has been in all cases universally hairy. We have, indeed, some accounts of people, particularly in the islands of the South Sea, remarkable for their hairiness; but they are not completely satisfactory. SPANGBERG relates, that he found such a race in one of the southern Kurile islands (lat. 43° 50°) on his return from Japan to Kamtschatka;[‡] and J. R. FORS

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[*] AUDEBERT, "Hist. Nat. des Singes;" Planche Anat. 2. fig. 6. The short description of this animal, which, from the enormous size and strength of his jaws, must be extremely formidable, given by WURMB in the 2d vol. of the "Memoirs of the Batavian Society in Dutch," is translated in the work of AUDEBERT, p. 22 and 23. It is the first and only description we have of the animal. BUFFON, who had never seen this creature, nor any part of it, gives the name of Pongo to the orang-utang.

[†] "Fauna Suecica;" Præf.

[‡] "Russischer Geschichte;" T. III. p. 174.

TER observed individual anomalous instances in the islands of Tanna, Mallicollo, and New Caledonia.[*] It was reported to Mr. MARSDEN, when inquiring concerning the aborigines of Sumatra, that there are two species living in the woods, with peculiar language: one of these (called orang-gugu) was described as "differing but little in the use of speech from the orang-utang of Borneo, their bodies being covered with long hairs.[†]"

These accounts furnish no satisfactory proof that any race[‡] of men exists with a skin differently organized or covered from what we are acquainted with. The smoothness and nakedness of the human integuments therefore form a sufficient diagnostic character of our species, as compared to the monkey, or any other nearly allied mammiferous animal: and this circumstance, with the absence of all fur, spines, bristles, &c. and the want of those natural offensive weapons, fangs, talons, claws, &c., justify us in denominating the human body as naturally unarmed and defenceless. The deficiency is amply made up by the internal faculties, and the arts to which they give rise.

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[*] "I observed several of these people (the Mallicollese) who were very hairy all over the body, not excepting the back; and this circumstance I also observed in Tanna and New Caledonia." "Observations on a Voyage round the World," p. 243. That this hairiness is neither common to all the natives of the islands enumerated, nor even very frequent or remarkable in accidental cases, may be inferred from its not being at all noticed by COOK, who however describes minutely the persons of these islanders. "Voyage towards the South Pole, v. ii, pp. 34, 78, 118.

[†] "History of Sumatra." ed. 3, p. 41, note.

[‡] The skin, like other parts, is subject to occasional varieties of formation. Thus patches of it are sometimes thickly covered with hair, like that on the head. Such accidental varieties, exaggerated by credulity and fraud, have given occasion to reports of persons having hides like animals. BUFFON, ("Supplement," v. 4. p. 571,) WUNSCH, ("Kosmologische Unterhaultungen," part 3,) and LAVATER, ("Physiog. Fragm." part 4, p. 68,) have given figures and descriptions of A. M. HERRIG, a woman of Triers, said to have the skin of a deer, and shown in many parts of Europe. SOEMMERRING saw this person, and found the peculiarity to consist of numerous and large elevations of the skin, covered by thick and strong hairs. They were of the nature of the moles often seen on the face of very fair persons, and generally giving origin to hairs. He could not discover a single hair resembling that of a deer. "Beschreibung einiger Missgeburten," p. 34.

While man is remarkable for the smoothness of his skin on the whole, some parts are even more covered with hair than in animals; as, for example, the pubes and exilla, which the ancients consequently regarded as peculiar characters of man.

In comparing man with the anthropo-morphous simiæ, it must be noticed further, that one species (satyrus) has no nail on the thumb of the hind hand; and the other (troglodytes,) according to TYSON, has thirteen ribs. Both of them have a sacrum composed of three pieces only, instead of five, as in the human subject. One at least (satyrus) has one or two large membranous pouches on the front of the neck, under the platysma myoides, communicating with the cavity of the larynx, between the os hyoides and thyroid cartilage, and capable of distention and evacuation at the will of the animal.* It has no ligamentum teres in the hip-joint.† It has a membranous canal running along the spermatic cord from the abdomen to the tunica viginalis,‡ as other monkeys and quadrupeds have; but this does not exist in the chimpansé.‖ The roof the mouth is nearly black.

I venture to assert that the differences only which have been just enumerated, without any others, would be amply sufficient to establish the distinction of species; that no example can be adduced of animals deviating so far from the original model of their structure as to exhibit varieties like those just enumerated; and consequently, that the differences in question can be accounted for only by referring the animals to species originally distinct.

There are some points, in which man has been erroneously supposed to differ from animals. The approximation of the two eyes is not peculiar; they are much nearer together in the simia.

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* CAMPER in *Philos. Trans.* v. 69, p. 139. *Œuvres:* t. i. *De l'Orang*, ch. ii. pl. ii. fig. 9 and 10. To the passage of the air in expiration into these pouches CAMPER ascribes the want of power of the orang-utang to produce articulated sounds.

† CAMPER, *Œuvres*, i. 153.

‡ Ibid. 109.

‖ TYSON, p. 82.

Many other mammalia, particularly among the quadrumana, have cilia in both eyelids; this is the case in the elephant.

Although the prominent nose, is a striking character of the human face, particularly in comparison with the monkeys, whose very name (simia, from simus) is derived from the flatness of this part, there is a species considerably surpassing man in the length of this feature;—the long-nosed monkey, s. rostrata, or nasalis.[*]

The external ears are not incapable of motion in all men; nor are they moveable in all other mammalia: in the anteaters, for example.

Many quadrumana have an organ of touch, and uvula, as well as man.

Again there are some parts, which man alone, or with a few other mammalia, does not possess. Most of these, which are found chiefly in the domesticated kinds, were formerly attributed to man, when human dissections, from want of opportunities, were uncommon.

The paniculus carnosus, or thin subcutaneous stratum of muscular fibres covering the ventral and lateral parts of the trunk immediately under the skin,—described by Galen and his followers, and even by Vesalius, the great restorer of anatomy and exposer of Galen's errors, as a part of the human body,—does not exist in man, nor, according to Tyson, in the chimpansé. It is found in the monkeys.

The rete mirabile of the cerebral arteries, included by Galen among the parts of the human body, was shown by Vesalius not to belong to the human structure.

The seventh or suspensory muscle of the eyeball, which is found in the four-footed mammalia, is not seen in man, as Fallopius observed; neither is the alantois or membrana nictitans.

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[*] Buffon, *Hist. des Quadrupèdes; Supplem.* t. vii. tab. 11, 12. The animal is also figured by Blumenbach, *Abbildungen*; No. 13; and by Pennant, *History of Quadrupeds*, v. 2, p. 322, pl. 104 and 105, under the name of proboscis monkey. The nostrils of this proboscis do not terminate, as in man, close to the upper lip; but at the extremity of the prominence: and the structure, in other respects differs essentially from that of the human nose.

That man has neither the ligamentum nuchæ nor the intermaxillary bone, has been already explained. The foramen incisivum is common to the human species with quadrupeds: it is small and single in the former; double and of considerable size in the latter.

There are a few other parts, not found in many animals, and sometimes erroneously ascribed to man; such as the pancreas Asellii, hepatico-cystic ducts, corpus Highmori, &c.

CHAPTER VI.

Differences in the Structure of some Internal Organs.

The instrument of knowledge and reflection, the part by which we feel, perceive, judge, think, reason—the organ or organs connecting us with the external world, and executing the moral and intellectual department in our economy—claim our first attention. In spite of metaphysical subtlety, of all the chimeras and fancies about immaterial agencies, ethereal fluids, and the like, and all the real or pretended alarms so carefully connected with this subject, the truth, that the phenomena of mind are to be regarded physiologically merely as the functions of the organic apparatus contained in the head, is proved by such overwhelming evidence, that physiologists and zoologists have been led, almost in spite of themselves, to show their belief in it, by the great attention they have paid to this part.

The vast superiority of man over all other animals in the faculties of the mind, which may be truly considered as a generic distinction of the human subject—in my opinion a more unequivocal and important one than many of those, in compliance with which diversity of genus and species is established in the animal kingdom—led physiologists at a very early period to seek for some corresponding difference in the brains of man and animals.

It has been asserted, from remote times, that the brain of man is larger than that of any animal: and I know no exception to this assertion of ARISTOTLE and PLINY, besides the elephant; unless the larger cetacea should be as well supplied with brain, in proportion to their size, as the smaller, Certainly, all the larger animals, with which we are more commonly acquainted, have brains absolutely smaller, and considerably so, than that of man. This, indeed, may be easily shown by a comparison of skulls; by contrasting the compressed, narrow, elongated crania of brutes, hidden behind their enormous jaws and face, with the length, breadth, and ample vault of the human "cerebri tabernaculum,"* whose capacious globular expanse surmounts and covers the inconsiderable receptacles of the senses and alimentary apparatus.

In later times the subject has been investigated in a different way—by comparing the proportion which the mass of the brains bears to the whole body. The result of this comparison in the more common and domestic animals was deemed so satisfactory, that, without prosecuting the inquiry further, a general proposition was laid down, that man has the largest brain in proportion to his body. More modern physiologists, however, in following up this comparative view in a great number of animals, have been considerably perplexed at discovering many exceptions to the general position. They found that several mammalia, as the dolphin, seals, some quadrumana, and some animals of the mouse kind, equal the human subject, and that some small birds even exceed him in this respect.†

As these latter observations entirely overturned the conclusion which had been before generally admitted, SOEMMERING has furnished us with another point of comparison; viz. that of the ratio, which the mass of the brain bears to the bulk of the nerves arising from it. Let us divide the brain into two parts; that which is immediately connected with sensorial extremities of the nerves, which receives their impressions, and is therefore devoted to those common wants and purposes which we partake with animals. The second division will include the rest of the brain, which may be considered as the seat of the mental phenomena.

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* HALLER.

† It cannot be a very satisfactory mode of proceeding to compare the body, of which the weight varies so considerably, according to illness, emaciation, or embonpoint, with the brain, which is affected by none of these circumstances, and seems to remain constantly the same. Thus in the cat, the weight of the brain, compared to that of the body, has been stated as 1 to 156, by one anatomist; as 1 to 82 by another: that of the dog as 1 to 305, 1 to 47, &c. The following numbers, taken principally from HALLER (*Elément. Physiol.* lib. x. sect. 1.) and CUVIER (*Leçons d'Anat. Comp.* Leç. ix. art. 5,) will

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show that, in the proportionate mass of his brain, man is surpassed only by a few small, slender, and lean animals.

Child of 6 years, 2lb. 28½ dr. or $\frac{1}{22}$.—HALLER.

Adult, $\frac{1}{35}$. HALLER. From 2 lb. 3½ oz. to 3 lb. 3¾ oz. SOEMMERING.

Orangs.

Chimpansé, of 26 inches in height, 11 oz. 7 dr. TYSON. A proportion equal to the human.

Gibbon (S. Lar.) $\frac{1}{48}$.

Sapajous, or American monkeys with prehensile tails.

Saïmiri (S. sciurea,) $\frac{1}{22}$; Saï (S. capucina,) $\frac{1}{25}$; Ouistiti (S. jacchus,) $\frac{1}{28}$.

Coaita (S. paniscus,) $\frac{1}{41}$.

Apes.—Malbrouc (S. faunus,) $\frac{1}{24}$; Callitriche (S. sebæa,) and Patas (S. rubra,) $\frac{1}{41}$; S. mona, $\frac{1}{44}$; Mangabey (S. fuliganosa,) $\frac{1}{48}$.

Baboons,—Macaque, (S. cynomologus,) $\frac{1}{86}$: Magot, (S. sylvanus,) $\frac{1}{105}$; Great Baboon, (S. sphynx,) $\frac{1}{104}$.

Lemurs.—Mococo, (L. catta,) $\frac{1}{81}$; Vari, (L. macaco,) $\frac{1}{84}$.

Bat, (V. noctula,) $\frac{1}{96}$; Mole, $\frac{1}{36}$; Bear. $\frac{1}{625}$; Hedgehog, $\frac{1}{168}$.

Fox, $\frac{1}{205}$; Wolf, $\frac{1}{230}$; Martin, $\frac{1}{365}$; Ferret, $\frac{1}{138}$.

Beaver, $\frac{1}{290}$; Hare, $\frac{1}{228}$; Rabbit, $\frac{1}{140}$—$\frac{1}{152}$; Water-rat, $\frac{1}{124}$.

Rat, $\frac{1}{76}$; Mouse, $\frac{1}{43}$; Field-mouse, $\frac{1}{31}$.

Wild Boar, $\frac{1}{672}$; Domestic, $\frac{1}{512}$—$\frac{1}{412}$; Elephant, $\frac{1}{500}$ 7 or 10 lb.

Stag, $\frac{1}{290}$; Roebuck (young) $\frac{1}{94}$; Sheep, $\frac{1}{351}$—$\frac{1}{192}$; Ox, $\frac{1}{750}$—$\frac{1}{860}$.

In proportion, then, as any animal possesses a larger share of the latter and more noble part,—that is, in proportion as the organ of reflection exceeds that of the external senses,—may we expect to find the powers of the mind more diversified and more fully developed. In this point of view man is decidedly pre-eminent: although in his senses and common animal properties he holds only a middle rank, here he surpasses all other animals that have been hitherto investigated: he is the first of living beings. " All the simiæ," says this accomplished anatomist, " for I have been fortunate enough to procure specimens of the four principal divisions, come after him; for although the proportion of their brain to the body, particularly in the small species with prehensile tails, is equal to that of man, their very large eyes, ears, tongue, and jaws, require a much larger mass of brain than the corresponding parts in the human subject; and if you remove this, the ratio of the brain to the body is much diminished.*

" Animals of various kinds seem to me to possess a larger or smaller quantity of this superabundant portion of brain, according to the degree of their sagacity and docility. The largest brain of a horse, which I possess, weighs one pound seven ounces; the smallest human brain that I have met with in an

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Calf, $\frac{1}{219}$; Horse, $\frac{1}{700}$, $\frac{1}{400}$; Ass, $\frac{1}{154}$.

Dolphin (delphinus delphis,) $\frac{1}{25}$, $\frac{1}{36}$, $\frac{1}{60}$, $\frac{1}{102}$; Porpoise (D. Phocæna,) $\frac{1}{93}$.

Birds.—Eagle, $\frac{1}{260}$; Falcon. $\frac{1}{102}$; Goose, $\frac{1}{360}$ (HALLER;) Duck $\frac{1}{257}$; Cock, $\frac{1}{25}$; Blackbird, $\frac{1}{68}$; Redbreast, $\frac{1}{32}$; Chaffinch, $\frac{1}{27}$; A Fringilla, carefully weighed and examined by HALLER, $\frac{1}{27}$; Sparrow, $\frac{1}{25}$; Canary bird, $\frac{1}{14}$.

Reptiles.—Turtle, $\frac{1}{5688}$; Tortoise, $\frac{1}{2240}$; Coluber-natrix, $\frac{1}{792}$; Frog, $\frac{1}{172}$.

Fishes.—Shark, $\frac{1}{2496}$; Dog-fish, $\frac{1}{1344}$; Pike, $\frac{1}{1305}$; Carp, $\frac{1}{160}$.

* BLUMENBACH has figured the brain of the ribbed-nose baboon or mandrill (papio maimon) in the two first editions of his work *De Gen. Hum. Var. Nat.* tab. 1. fig. 1. The deviation from the human character in the size of the nerves is very striking.

adult, two pounds, five ounces and a quarter. But the nerves in the basis of the horse's brain are ten times larger than in the other instance, although it weighs less by fourteen ounces and a quarter.

"But we are not hastily to conclude that the human species have smaller nerves than any other animals. In order that my ideas may be better understood, I shall state the following imaginary case. Suppose the ball of the eye to require 600 nervous fibrils in one instance; and in another, half the size, 300: further, that the animal with 600 fibrils possesses a brain of seven, and that with 300 a brain of only five drams. To the latter we ought to ascribe the larger brain, and a more ample capacity of registering the impressions made on the organ of vision. For, allowing one dram of encephalon to 100 fibrils, the brain, which is absolutely the least, will have an overplus of two drams, while the larger has only one. That the eye, which is supplied with a double quantity of fibrils, may be a more perfect organ of sense, will be readily admitted: but that point is not connected with the present question."[*]

Independently of weight and size, SOEMMERING observed fifteen visible material anatomical differences between the brain of the common tail-less ape and that of man.[†]

It must be acknowledged, that the inquiries into the relative weight of the brain and the body, and the comparison between the former and the nerves connected with it, have not yet afforded any precise and clear information respecting the differences between man and animals, nor on the grounds of the infinitely various faculties that distinguish different animals. It can hardly be expected that these matters will receive any clear elucidation, while we continue so ignorant as at present of the functions executed by the different parts of the encephalon.

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[*] *Ueber die Körperliche Verschiedenheit des Negers vom Europäer*; p. 63 67.

See also the dissertation of the same author *De Basi Encephali*; and J. G. EBEL *Obs. Neurol. ex Anat. Comparata*, p. 17; Francof. ad Viadr. 1788; or in LUDWIG *Scriptores Neurologici*.

[†] *Ueber die Körp. Versch.* p. 77, note.

The basis of the position so much insisted on by SOEMMERING is an assumption that a certain bulk of nerve requires always the same proportion of brain for the execution of its office—a datum by no means self-evident. The comparison of the nerves to *the brain* in general is not satisfactory: we should wish to know the relative proportions of the cerebrum, cerebellum, and medulla oblongata. The latter, indeed, is an important point; as most of the nerves are immediately connected with it, few with the cerebrum, and none with the cerebellum, properly so called.

The most striking character of the human brain is the prodigious developement of the cerebral hemispheres, to which no animal, whatever ratio its whole encephalon may bear to its body, affords any parallel.*

It is also the most perfect in the number and developement of its parts; none being found in any animal, which man has not; while several of those found in man are either reduced in size, or deficient, in various animals. Hence it has been said, that by taking away, diminishing, or changing proportions, you might form, from the human brain, that of any animal; while, on the contrary, there in none from which you could in like manner construct the brain of man.

It approaches the most nearly to the spherical figure. That the nerves are the smallest in proportion to the brain, has been already pointed out: the brain diminishes, and the nerves increase from man downwards. In the fetus and child the nerves are proportionally larger than in the adult.

The assertion that it has the largest cerebrum in proportion to the cerebellum† does not seem to be quite correct. It has, however, the largest cerebrum in proportion to the medulla oblongata

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* On this point, I apprehend, from the following passage, that the WENZELS agree with what is stated in the text; "Homini pro ratione longe plus massæ cerebri inesse, quam mammalibus, sive illam massæ cerebri partem, quæ in interiore cerebro sitas, peculiariter formatas, sive individuas partes ambit, in homine pro ratione majoram esse, quam in mammalibus."—*De penitiori Struct. Cerebri Hominis et Brutorum*, p. 259.

† The following numbers indicate the comparative weights of the cerebrum and cerebellum:—

Man	1—9	Beaver	1—3
Saimiri	1–14	Rat	1—3½

and spinalis,* with the single and indeed singular exception of the dolphin.

It has the deepest and most numerous convolutions, apparently in consequence of its size, as the purpose of this structure seems to be that of affording a more extensive surface for the application of the vascular membrane, the pia mater. The convolutions become fewer and shallower as the brain diminishes in size: there are none in the rodentia; none in very small brains.

It has the greatest quantity of medullary substance in proportion to the cortical. In the fetus, the cortical is much more abundant than in the adult.

Sai - -	1—6	Mouse - -	1—2
Magot - -	1—7	Hare - -	1—6
Baboon - -	1—7	Wild Boar - -	1—7
S. Mona - -	1—8	Cow - -	1—9
Dog - -	1—8	Sheep - -	1—5
Cat - -	1—6	Horse - -	1—7
Mole - -	1—$4\frac{1}{2}$		

CUVIER, *Leç. d'Anat. Comp.* ii. 153

The WENZELS, whose accuracy seems to deserve the greatest confidence, represent some of these proportions differently. They have found the cerebrum, compared to the cerebellum, to be in a man, as $6\frac{51}{125}$—$8\frac{42}{121}$ to 1; in the horse, $4\frac{1}{2}$ to 1; cow, $5\frac{1}{2}$[illegible] to 1; dog, $6\frac{4}{25}$ to 1; cat, $4\frac{1}{15}$ to 1; mole, $3\frac{1}{2}$ to 1; mouse, $6\frac{2}{3}$ to 1. *Lib. cit.* tab. iv.

* The breadth of the medulla oblongata behind the pons Variolii, compared to the greatest breadth of the brain, is,

In Man, as - - - -	1—7	Pig - -	5—7
Simia sinica (Bonnet Chinois	1—4	Sheep - -	5—7
S. Cynomologus - -	1—5	Roe - -	1—3
Dog - -	6—11 or 3—8	Cow - -	5-13
Cat - - - - -	8—22	Calf - -	2—5
Rabbit - -	3—8—1—3	Horse - -	8-21
		Dolphin - -	1-13

In the latter animal, the breadth of the brain is twice its length;—a proportion, of which there is no other instance in the animal kingdom.

Soemmering has shown that that curious structure, the sandy or earthy matter of the pineal gland (acervulus pinealis) belongs to the healthy natural state of the human brain, being found from the fourteenth year; and that it is almost confined to man.* He found it, however, once in the fallow-deer (cervus dama;) and **Malacarne**† met with it in the goat. An instance communicated by **Caldani**, of an old man in whose brain it was deficient, is regarded by **Blumenbach**‡ as a rare anomaly of structure.||

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* *De Lappillis vel prope vel intra Glandulam Pinealem sitis;* Mogunt. 1785.

† *Encefalotomia d'alcun Quadrupedi*, p. 31.

‡ *De G. H. Var. Nat.* p. 44. From the very accurate researches of the **Wenzels**, it appears that a deficiency of the acervulus is not so unfrequent as has been represented by **Soemmering**; and they found, on the other hand, that the latter excellent anatomist has not been correct in fixing the fourteenth year as the date of its earliest appearance: they have met with it from the age of seven. They mention six instances, in which the acervulus did not exist. *De penitiori Structura Cerebri Hominis et Brutorum*, Tubingæ, fol. 1812, p. 316.

|| The human encephalon undergoes considerable changes after birth, in its entire mass, in the proportions of its parts, and in the texture and consistency of its substance. The gradual evolution of the mental faculties corresponds to these alterations; which, indeed, accord with the slow developement of the human frame in other respects. The **Wenzels** have afforded accurate information on some points. In an embryo of five months they found a brain of 720 grains; cerebrum of 683; cerebellum of 37, which is a ratio of the former to the latter as $18\frac{17}{37}$ to 1: at eight months the numbers were 4960, 4610, 350, or as $13\frac{6}{35}$ to 1: at the time of birth, as 6150, 5700, 450, or $12\frac{2}{3}$ to 1: at three years, 15,240, 13,380, 1860, or $7\frac{6}{31}$ to 1: at five years, 20,250, 17,760, 2490, or $7\frac{11}{82}$ to 1: From fifteen to eighty-eight the highest numbers occurred in a youth of the former age; they were 24,420, 21,720, 2700, or $8\frac{6}{125}$ to 1. Tab. 3.

Soemmering observes, in the explanation of his beautiful *tabula baseos encephali*, p. 13, that the human brain has reached its full developement at three years of age: the **Wenzels** affirm that this is not the case till seven, when, they observe, "cerebrum hominis et quoad totum et quoad singulas partes absolutum esse videtur." p. 247. If the perfect state of the brain be considered to include the proportionate developement of parts, the entire size and weight, the consistence and cohesion of the mass, and the state of vascular supply characterizing the adult, we must fix as its era a much later period than the seventh year. I apprehend that the brain of animals will be found nearly perfect in its organization at the time of birth; and, consequently, that a compari-

The position of the heart in biped man differs from that which it holds in quadrupeds. Its oblique direction to the left side, its flat surface resting on the diaphragm, and the firm attachment of its serous membrane to the tendinous centre of that muscle, present, in the former, a contrast to its straight situation in the middle of the chest, to its support on the sternum, and to the want of attachment between the pericardium and the muscle, which are even separated by a distinct interval in the latter; a constrast easily explained by the differences in the form of the thorax, and in the respective attitudes in the two cases. The orangs (S. satyrus, troglodytes, and gibbon) have it placed as in man, and the pericardium attached to the diaphragm. In other simiæ the apex only is a little inclined to the left, aud touches the muscle.

The curvature of the sacrum and os coccygis gives rise to the peculiar situation and direction of the sexual organs, and particularly of the vagina in the human female. As these bones are extended in the same straight line with the spine in all other mammalia, the canal of the vagina follows the axis of the pelvis, lies nearly parallel to the spine, and has its external orifice directed downwards or backwards: the orifice of the urethra opens into the vagina itself. These arrangements fully explain to us why brutes discharge their urine behind, why they copulate backwards, and why parturition is so easy with them.

In these points of structure the monkey kind agree with the mammalia in general, and differ from man. The axis of the vagina is directed downwards in them; the urine is discharged within it (such at least BLUMENBACH[*] found to be the case in the

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son of man and animals in this point of view will disclose a remarkable point of distinction between them. The medullary striæ of the fourth ventricle are not seen at birth: their appearance in the first year, and that of the acervulus in the seventh, are regarded by the WENZELS as great peculiarities of the human brain, since that of the mammalia exhibits no such developement of new parts after birth. Cap. 27. This seems to me a confined and inadequate view of a point, which, in its full extent, is of great importance.

[*] *De G. H. Var. Nat.* lect. i. § 7. The urethra does not, however, open within the vagina in the orang-utang. CAMPER mentions that the nymphæ of this animal were "comme reunies ensemble," and that the urethra opened below them. *Œuvres*, i. 102.

papio maimon and the simia cynomolgus,) and they are, consequently, retro-mingent and retro-copulant.

Mr. Hunter, who had opportunities of observing the process, informs us that "monkeys always copulate backwards: this is performed sometimes when the female is standing on all fours; and at other times the male brings her between his thighs when he is sitting, holding her with his fore-paws."*

Dr. Froriep, of Weimar, late physician to the King of Wurtemberg, informed me that he had often seen monkeys copulate in the extensive menagerie of that monarch; and that they performed the process backwards; the male supporting himself by the feet on the calves of the female, so that he did not touch the ground.

The incurvation of the sacrum and coccyx turns the human vagina forwards, so that its axis cuts that of the pelvis nearly at right angles, and its anterior opening is turned forwards: the urethra opens on its upper and front edge, not at all within the canal. Hence the human female differs from all other mammalia† in not being retro-mingent and retro-copulant; hence, too, although many inconveniences to which she would have been otherwise exposed, particularly during pregnancy, are obviated, par-

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According to Cuvier, the female urethra always opens at the external orifice of the vagina, and therefore holds the same situation, in respect to this canal, in all animals. The canal exterior to this termination of the urethra he calls *vulva*. It is a simple entrance of little depth in the human subject; rather larger in the baboons; equal in length to the vagina itself in some other monkeys, as the sapajous; or even superior, as in the bear. *Leç. d'Anat. Comp.* v. 128.

On account of the great depth of the symphysis pubis in the orang-utang (two inches in an animal of little more than two feet, which is equal to its greatest depth in the tallest woman,) the urethra of the orang-utang is even longer than that of the human female. Camper, ut supra, p. 107.

* *Animal Economy*, p. 136.

† Probably the cetacea may form an exception to this statement. Our attention, however, is hardly extended to them in this comparison of man and animals. According to the representation of Steller, the manati and the ursine seal (sea-cow and sea-bear) copulate in the human method. *Nov. Comm. Acad. Scient. Petrop.* v. ii. pp. 325 and 354.

turition is rendered much more difficult, and a physical reason is found for that doom under which she labors, of bringing forth children in sorrow and in pain.

Although it cannot be deemed an internal organ, this seems the fittest place for mentioning the hymen, an interesting part of the female structure in many respects, and therefore more noticed and investigated than so small a fold of skin would have seemed to deserve. The general opinion of its non-existence in the other mammalia besides man, and the circumstance of its being found in women only at a particular period of life, and even then not universally, have led many anatomists to deny its existence altogether. The question, however, can be so easily settled by direct evidence, that we are surprised to find **Buffon**, still contesting the point. Though the opinion of this great naturalist is incorrect in point of fact, we cannot but admire the eloquence with which he inveighs against the disgraceful opinions and practices which have prevailed on this subject.[*]

It has been generally asserted that this little part is found only in the human subject. In the female orang-utang CAMPER* says that the hymen was not apparent, although the individual was very young. BLUMENBACH† informs us that he could neither find any trace of this part, nor those supposed remains of it called carunculæ myrtiformes, in monkeys or baboons; and that his search was equally fruitless in a female elephant, in which it had been reported that a hymen existed. CUVIER,‡ on the contrary, represents that several mammalia have a distinct membranous fold at the entrance of the vagina, and others a decided contraction in the same situation.

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[*] "Les hommes, jaloux des primautés en tout genre, ont toujours fait grand cas de tout ce qu'ils ont cru pouvoir posséder exclusivement et les premiers: c'est cette espèce de folie, qui a fait un être reel de la virginité des filles. La virginité, qui est un être moral, une vertu qui ne consiste que dans la pureté du cœur, est devenu un objét physique dont tous les hommes se sont occupés; ils ont établi sur cela des opinions, des usages, des ceremonies, des superstitions, et même des jugemens, et des peines; les abus les plus illicites, les coutumes les plus deshonnètes ont étés autorisées; on a soumis à l'examen des matrones ignorantes, et exposé aux yeux de médecins prevenus les parties les plus secrètes de la nature sans songer qu'une pareille indécence est un attentat contre la virginité; que c'est la violer que de chercher la reconnoitre; que toute situation honteuse, tout état indécent, dont une fille est obligée de rougir interieurement, est une vrai défloration. Je n'espere pas reussir à detruire les prejugés ridicules qu'on s'est formés sur ce sujet; les choses, qui font plaisir à croire, seront toujours crues, quelques vaines et quelques deraisonnables qu'elles puissent être; cependant, comme dans une histoire on rapporte non seulement la suite des evènemens, et les circonstances des faits, mais aussi l'origine des opinions et des erreurs dominantes, j'ai cru que dans l'histoire de l'homme, je ne pourrois me dispenser de parler de l'idole favorite à laquelle il sacrifie, d'examiner quelles peuvent être les raisons de son culte, et de rechercher si la virginité est un être réel, ou si ce n'est qu'une divinité fabuleuse."

It is not so easy to explain the use or purpose of this membrane, as to establish the fact of its existence. This little fold has indeed completely puzzled the physico-theologists, who have as yet assigned no rational explanation of it. The moral purposes alluded to by HALLER|| are quite unintelligible in our own species; and are still more inapplicable to the case of brutes.

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* *Œuvres*, i. 102.

† *De G. H. Var. Nat.* Lect. i. § 8.

‡ He states, on the authority of STELLER, that the northern manati has a strong semilunar fold at the orifice of the vagina, contracting the entrance of that canal; that the mare and ass have a similar structure; and that in the ouistiti (simia jacchus,) the marikina (S. rosalia,) and the coaita (S. paniscus,) there are two lateral semilunar folds, leaving between a perpendicular slit. In the otter, dog, cat, and ruminants, he found a constricted circle. In the brown bear there was a thick lip-like fold of the internal membrane, reducing the entrance of the vagina to a simple transverse slit; and the hyena exhibited an analogous structure. A young hyrax had a very distinct circular hymen. *Leç. d'Anat Comp.* t. V. p. 131—2.

|| "Vix tamen dubites, cum solo in nomine sit repertus, etiam ad morales fines ei esse concessum signum pudicitiæ, quo et vitium illatum cognoscatur, et pura virgo decus suum possit tueri, et ipse maritus de castitate sponsæ facile convincatur, eo facilius, quod praterea in illibata virgine vagina angusta sit. Etsi enim possit fieri ut parvus, ut laxus sit hymen, atque prima venus aliquando absque sanguine absolvatur, neque hymen rumpatur; etsi artificio porro in parum pudica fœmina sanguis possit elici; etsi teneræ virgines aliquando etiam in altero coitu sanguinem reddunt, et menses fluentes vaginam laxant; tamen in universum debet prima venus cruenta esse, eoque signo pudor virgineus adseri, cum vix possit plena venus obtineri, quin superior margo partis majoris hymenis laceretur. Quare et Mosaicæ leges, et multorum populorum consuetudo, hoc signum servatæ castitatis et requirunt et ostentant, et de ex-

The clitoris and the nymphæ have been supposed peculiar to the human female, as well as the hymen; the latter, indeed, are generally absent in the mammalia; but BLUMENBACH[*] informs us that a lemur, which he kept alive for many years, had them very closely resembling the human. The clitoris seems to be universally found in the mammalia: it is very large in the monkey kind, and in the carnivora; and BLUMENBACH[†] saw it of the size of a fig in a balæna boops stranded on the coast of Holland.

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emplis in virginibus etiam pene trigenariis certus sum, quæ insignem in primâ venere sanguinis jacturam sunt passæ." *Elem. Physiol.* lib. 28. sect. 2. § 27.

[*] *Lib. cit.* p. 21.

[†] *Lib. cit.* p. 21.

CHAPTER VII.

Peculiarities in the Animal Economy of the Human Species—general extension over the Globe.—Man Naturally omnivorous—his long infancy and slow developement—hence suited to the social state.

In the diversity of the regions which he is capable of inhabiting, the lord of the creation holds the first place among animals. His frame and nature are stronger and more flexible than those of any other creature; hence he can dwell in all situations on the surface of the globe. The neighborhood of the pole and the equator, high mountains and deep valleys, are occupied by him? his strong but pliant body bears cold, heat, moisture, light or heavy air; he can thrive any where, and runs into less remarkable varieties than any other animals which occupy so great a diversity of abodes:—a prerogative so singular, that it must not be overlooked.

The situations occupied by our species in the present times extend as far as the known surface of the earth. The Greenlander and Eskimau have reached between 70° and 80° of North latitude, and Danish settlements have been formed in Greenland in the same high latitude. Three Russians lived between six and seven years on Spitzbergen, between 77° and 78° North latitude.[*] The negro lives under the equator; and all America is inhabited even to Tierra del Fuego. Thus we find that man can exist and propagate his species in the hottest and coldest countries of the earth.

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[*] Dr. Aikin *on the attempts to winter in high Northern latitudes: Manchester Society's Memoirs*; v. i. p. 96.

The greatest natural cold ascertained by thermometrical measurement was that experienced by the elder Gmelin in 1735, at Jeniseik: the mercury froze in the thermometer.[*] The sparrows and jays were all killed. When Pallas was at Krasnoiarsk, the quicksilver also froze in the ball of the thermometer; and a large mass of pure mercury froze in the open air.[†] Our own countrymen experienced apparently as severe a degree of cold on the Churchill River in Hudson's Bay. Brandy was frozen in the rooms where they had fires.[‡] Yet the Canadian savages and the Eskimaux go to the chase in this temperature; and the inhabitants of the countries visited by Gmelin and Pallas cannot remain in their houses all the winter. Even Europeans accustomed to warmer climates, can undergo such cold as I have just mentioned, with impunity, if they take exercise enough. The Danes have lived in Greenland in 72° N. L.; and the Dutch, under Heemskerk, wintered at Nova Zembla in 76° N. L. Some of them perished; but those who moved enough, and were in good health at first, withstood the dreadful cold, which the polar bear, (ursus maritimus) apparently born for these climes, seems to have been incapable of supporting: for their journal states, that as soon as the sun sinks below the horizon, the cold is so intense that the bears are no longer seen, and the white fox (isatis, canis lagopus) alone braves the weather.[||] We have another example, in which three men remained between six and seven years in 78° N. L.[§]

The power of the human body to withstand severe cold will appear in a more remarkable light, when we observe what heat it is capable of bearing. Boerhaave asserted, that a temperature of from 96° to 100° would be fatal to man. The mean temperature of Sierra Leone is 84° Fahr.: Messrs. WATT and WINTERBOTTOM saw the thermometer frequently at 100°, and even 102° and 103° (in the shade,) at some distance from the coast.* ADANSON saw it at 108½° in the shade at Senegal in 17° N. L.†: and BUFFON cites an instance of its being seen at 117½°. The country to the west of the Great Desert may be still hotter than Senegal, from the effect of the winds which have swept over the whole tract of its burning sands. When the sirocco blows in Sicily, the thermometer rises to 112°, according to BRYDONE. Dr. CHALMERS observed a heat of 115° in South Carolina in the shade:‡ and HUMBOLDT, of 110° to 115° in the Llanos or deserts near the Orinoco in South America.||

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[*] *Flora Sibirica;* Pref.

[†] *Travels in Russia;* pl. 3.

[‡] *Philos. Trans.* No. 465.

[||] *Voy. de la Comp. des Indes;* pl. 1. A short account of the voyage is given by Mr. Barrow, in his *Chronological History of Voyages into the Arctic Regions*, chap. II. The polar star disappeared, and the white foxes were seen in great numbers, as soon as the sun set: when it rose again, the foxes went away, and the bears returned.

[§] Dr. Aikin, as above quoted.

Thus man can support all possible degrees of atmospherical heat and cold: he has an equal power of supporting varieties of pressure. The ordinary pressure of the air, at the level of the sea, may be reckoned at 32,325 lbs. for the whole surface of the body, supposing the barometer at 30 inches. If we ascend to a height of 12,000 feet, of which elevation extensive tracts, inhabited by thousands, are found in South America, the barometer stands at 20¼ inches, and the pressure is 21,750 lbs. CONDAMINE and BOUGUER, with their attendants, lived three weeks at a height of 2434 toises, or 14,604 French feet, where the barometer stood at 15 in. 9 lines, and the pressure must consequently have been 16,920 lbs.§ In the Peruvian territory, extensive plains occur possessing an altitude of 9000 feet; and three-fifths of the viceroyalty of Mexico, comprehending the interior provinces, present a surface of half a million of square miles, which runs nearly level at an elevation between 6000 and 8000 feet. Mexico is 7475, and Quito 9550 feet above the level of the sea. The hamlet of Antisana, 13,500 feet above that level, is the highest inhabited spot on the surface of our globe; but HUMBOLDT ascended Chimbora-

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* WINTERBOTTOM's *Account of the Native Africans*; v. i. p. 82—3.

† *Voy. au Sénégal.*

‡ *On the Weather and Diseases of South Carolina.*

|| *Tableau Physique des Régions Equatoriales.*

§ *Mém. de l'Acad. des Sciences*, année 1774; p 262—3.

ço, to 19,300 feet.[*] There are no instances of men living under a pressure much greater than what has been mentioned: the depths, to which the earth has been penetrated, in the operations of mining, are trifling in this point of view. In diving, however, the body is subject to, and can bear, several atmospheres; as, on the contrary, in balloons, men have ascended beyond any point of elevation on the surface of the earth,[†] and have consequently been exposed to a much more considerable diminution of the ordinary pressure than what I have stated above.

As the physical capabilities of his frame enable man to occupy every variety of climate, soil, and situation, it follows of necessity, that he must be omnivorous, that is, capable of deriving sufficient nourishment and support from all kinds of food. The power of living in various situations would be rendered nugatory by restriction to one kind of diet.

If it was the design of nature, that the dreary wastes of Lapland, the naked and barren shores of the Icy Sea, the ice-bound coasts of Greenland and Labrador, and the frightful deserts of Tierra del Fuego, should not be left entirely uninhabited, it is impossible to suppose that either a vegetable or even a mixed diet is necessary to human subsistence. How could roots, fruits, or other vegetable productions be procured, where the bosom of the earth is closed the greater part of the year, and its surface either covered with many feet of snow, or rendered impenetrable by frost of equal depth? Experience shows us that the constant use of animal food alone is as natural and wholesome to the Eskimaux, the Samoiedes, the inhabitants of Tierra del Fuego, &c. as the most careful admixture of vegetable and animal matters is to us. We even find that the Russians, who winter on Nova Zembla, are obliged to imitate the Samoiedes, by drinking fresh rein-deer blood, and eating raw flesh, in order to preserve their health. In the Memoir already quoted, Dr. AIKIN informs us that these practices were found most conducive to health in those high northern latitudes. Hence, we shall be less surprised at finding men, in certain situations, living and enjoying health on what seem to us the most filthy and disgusting objects. The Greenlander and the inhabitant of the Archipelago between north-eastern Asia and north-western America, eat the whale, often without waiting for cookery. The former bury a seal when they catch one, under the grass in summer, and the snow in winter, and eat the half-frozen, half-putrid flesh with as keen a relish as the European finds in his greatest dainties. They drink the blood of the seal while warm, and eat dried herrings moistened with whale oil.*

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[*] *Tableau Phys. des Régions Equatoriales*; and *Tableaux de la Nature*.

[†] The height of 23,040 feet above the level of the sea, reached by M. GAY LUSSAC in his second ascent, although considerably higher than the summit of Chimboraço, may however be surpassed by some peaks of the Himmaleh mountains; if the recent suppositions concerning their altitude should be hereafter verified.

In the torrid zone, on the contrary, circumstances are very unfavorable to raising and supporting those flocks and herds of domesticated animals, which would be necessary to supply the numerous population with animal food. The number, fierceness, and strength of beasts of prey, the periodical alternations of rains and inundations, with the long-continued operation of a vertical sun, whose direct rays dry up all succulent vegetables and all fluids, are the principal and insurmountable obstacles. The deficient supply of flesh is most abundantly compensated by numerous and valuable vegetable presents; by the cocoa-nut, the plantain, the banana, the sago-tree; by the potato, yam, cassava, and other roots; by maize, rice, and millet; and by an infinite diversity of cooling and refreshing fruits. By these precious gifts nature has pointed out to the natives of hot climates the most suitable kind of nourishment: here, accordingly, a vegetable diet is found most grateful and salubrious, and animal food much less wholesome.

In the temperate regions of the globe, all kinds of animal food can be easily procured, and nearly all descriptions of grain, roots, fruit, and other vegetable matters; and, when taken in moderation, all afford wholesome nourishment. Here, therefore, man appears in his omnivorous character. As we pass from these middle climes towards the poles, animal matters are more and more exclusively taken: towards the equator, cooling fruits and other produce of the earth constitute a greater and greater share of human diet.

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* CRANZ, *Gesch. von Grönland.*

The diversity of substances composing the catalogue of human aliments* offers a strong contrast to the simple diet of most other animals, which, in their wild state, are confined to one kind of food, either animal or vegetable, and are often restricted to some very small part of either kingdom. Hence it has been conceived that man also ought to confine himself to one sort, that he probably did so in *his natural state*, and that the present variety in his bill of fare is the consequence of degeneration or departure from nature. The question of the *natural food* of man has therefore, been much agitated.

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* To this long list, which, already comprehending most of the substances in the two organic kingdoms of nature, so fully justifies us in denominating man an omnivorous animal, we have to add, on the authority of recent trials in Germany, the wood of various trees. The ligneous fibres of the beech, birch, lime, poplar, elms, fir, and probably others, when dried, ground, and sifted, so as to form an impalpable powder, like coarse flour, are not only capable of affording wholesome nourishment to man or animals, but even with some admixtures, and some culinary skill, constitute very palatable articles of food. If cold water be poured on some wood flour, inclosed in a fine linen bag, it becomes milky, and considerable pressing or kneading is required to wash out from the flour all the starch-like matter it contains. Like starch, this matter slowly subsides in cold water; and it forms, when boiled with water, a thick tenacious paste, which will firmly agglutinate the leaves of pasteboard.

The following publications have appeared on the subject: viz. OBERLECHNER, *Ars fabricandi Frumentum verum*; Salzburg, 1805. *Wie kann man sich bey grosser Thuerung und Hungersnoth ohne Getried gesundes Brod verschaffen?* Salzburg, 1816. AUTENRIETH, *Gründliche Anleitung zur Brod-zubereitung, aus Holz*; Stuttgard, 1817.

The last work, by professor AUTENRIETH of Tubingen, analysed in the *Salzburg Medicinish-chirurgische Zeitung*, 1817, v. 3. No. 56.

The bark of trees has been long occasionally used as a substitute in times of scarcity, for other food. Professor VON BUCH has described the preparation and effects of the Norwegian Barke Bröd, which seems, however, a very imperfect and unwholesome kind of nutriment.—*Travels through Norway and Lapland*, p. 87.

The nature of an animal is only to be learned by an observation of structure, actions, and habits. From the powerful fangs and jaws, the tremendous talons, the courage, and the vast muscular strength of the lion, and his constant practice of attacking living prey, we pronounce his nature to be ferocious, predatory, and carnivorous. From evidence of the same sort, we determine the nature of the hare to be mild, timid, and herbivorous. In a similar way we conclude man to be naturally omnivorous; finding that he has instruments capable of procuring, masticating, and digesting all descriptions of food, and that he can subsist in health and strength on flesh or vegetables only, or on a mixture of both.

It is alleged in reply, that man in society is artificial and degenerate; and the object of inquiry is stated to be, what does he feed on before civilization, in his original unsophisticated condition? Generally on animal food, the produce of the chase or the fishery; because vegetable food cannot be obtained in sufficient certainty and abundance, until something like settled habits of life have begun, until the arts, at least that of agriculture, have commenced. If the rudest barbarism be the most natural state of man, the New Hollanders, and the inhabitants of Van Dieman's Land, are the most unexceptionable specimens; raised, and but just raised above the level of brutes. These savages are very thinly scattered, in small numbers, and at wide intervals, along the coasts of the great Austral Continent; and derive their support from the sea. They are not, however, pure icthyophagists, as they sometimes get a kangaroo, a bird, or a few roots, and sometimes the large larvæ of an insect from the bark of the dwarf gum-tree (eucalyptus resinifera:) sometimes they mix their roots with ants, and their larvæ into a paste.*

The individuals whom we send to New South Wales are not the best specimens of our iron age; yet they are far beyond those children of nature, in physical and moral attributes.

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* Collins, *Account of the English Colony in New South Wales;* Appendix, No. 4. Their habitations, if that name be deemed applicable to a hole in a tree or rock, or to a piece of bark stripped from a single tree, bent and laid on the ground; and the rest of their domestic and social economy, as pourtrayed in the same work; are quite in unison with their bill of fare.

The Greenlanders, the Kurilian and Aleutian islanders, the wandering hordes of Asia, and the hunting tribes of North America, are perhaps too much civilized to be admitted as examples of natural man : they are all carnivorous

If the practices of savage and barbarous people are to be the criterion, we must deem it natural to eat earth. "The Ottomaques," says HUMBOLDT,[*] "on the banks of the Meta and the Orinoco, feed on a fat unctuous earth, or a species of pipe-clay, tinged with a little oxyd of iron. They collect this clay very carefully, distinguishing it by the taste: they knead it into balls of four or six inches in diameter, which they bake slightly before a slow fire. Whole stacks of such provisions are seen piled up in their huts. These clods are soaked in water when about to be used; and each individual eats about a pound of the material every day. The only addition, which they occasionally make to this unnatural fare, consists in small fish, lizards, and fern roots. The quantity of clay that the Ottomaques consume, and the greediness with which they devour it, seem to prove that it does more than merely distend their hungry stomachs, and that the organs of digestion have the power of extracting from it something convertible into animal substance."

The same practice has been observed in other places.[†]

Is it a just point of view to regard the savage state exclusively as the state of nature? Is civilization to be considered as opposed to and incompatible with the nature of man?

A power of improvement, of advancement in arts and sciences, that is, the capability of civilization, or perfectibility, as it has sometimes been called, is recognised in all human beings: its degree is very various in individuals and races. All have lived in society, which strongly tends to promote and assist the developement of this power. Social life and progressive civilization, instead of being unnatural to man, are therefore parts, and very valuable parts of his nature, as much as the erect stature and speech; as much as ferocity and solitary life are the nature of predacious animals, or mildness and herding together are of many herbivorous ones. It is as much the nature of man to form societies, to build up political associations, to cultivate arts and sciences, to spread himself over the globe, and avail himself of both organized kingdoms for his support, as it is that of the bee and ant to establish their communities, to gather honey and lay up provisions, or that of any other animals to perform the actions by which they are respecttively characterized.

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[*] "Tab. Phys. des Régions Equatoriales."

[†] "I saw one man, whose stomach was also well lined, but who, in our presence, ate a piece of steatite, which was very soft, of a greenish colour, and twice as large as a man's fist. We afterwards saw a number of others eat of the same earth, which serves to allay the sensation of hunger by filling the stomach."—LABILLARDIERE, Voy. in search of LA PEYROUSE, v. 2. p. 214.

These considerations lead to the conclusion, that progressive advance and developement, and the employment of all kinds of food, are as natural to man, as stationary uniformity and restriction to one species of aliment are to any animals.

In discussing this question, we sometimes meet with positions respecting the influence of animal or vegetable diet on the developement of the bodily and mental powers, which are quite unsupported by direct proof; and some have even sought for a support to their systems in the fictions of poetry.

"The Pythagorean diet," says Buffon, "though extolled by ancient and modern philosophers, and even recommended by certain physicians, was never indicated by nature. If man were obliged to abstain totally from flesh, he would not, at least in our climates, either exist or multiply. An entire abstinence from flesh can have no effect but to enfeeble nature. To preserve himself in proper plight, man requires not only the use of this solid nourishment, but even to vary it. To obtain complete vigor, he must choose that species of food which is most agreeable to his constitution; and as he cannot preserve himself in a state of activity, but by procuring new sensations, he must give his senses their full stretch, and eat a variety of meats, to prevent the disgust arising from an uniformity of nourishment."

We are told on the other hand, that in the golden age man was as innocent as the dove; his food was acorns; and his beverage, pure water from the fountain. Finding every-where abundant subsistence, he felt no anxieties, but lived independent, and always in peace, both with his own species and the other animals. But he no sooner forgot his native dignity, and sacrificed his liberty to the bonds of society, than war and the iron age succeeded that of gold and of peace. Cruelty and an insatiable appetite for flesh and blood were the first fruits of a depraved nature, the corruption of which was completed by the invention of manners, arts, and sciences. Either immediately, or remotely, all the physical and moral evil, by which individuals are afflicted, and society laid waste, arose from these carnivorous practices.

Both these representations are contradicted by the only criterion in such questions, an appeal to experience. That animal food renders man strong and courageous, is fully disproved by the inhabitants of northern Europe and Asia, the Laplanders, Samoiedes, Ostiacs, Tungooses, Burats, and Kamtschadales, as well as by the Eskimaux in the northern, and the natives of Tierra del Fuego in the southern extremity of America; which are the smallest, weakest, and least brave people of the globe, although they live almost entirely on flesh, and that often raw.

Vegetable diet is as little connected with weakness and cowardice as that of animal matters is with physical force and courage. That men can be perfectly nourished, and their bodily and mental capabilities be fully developed in any climates by a diet purely vegetable, admits of abundant proof from experience. In the periods of their greatest simplicity, manliness, and bravery, the Greeks and Romans appear to have lived almost entirely on plain vegetable preparations: indifferent bread fruits, and other produce of the earth, are the chief nourishment of the modern Italians, and of the mass of the population in most countries of Europe: of those more immediately known to ourselves, the Irish and Scotch may be mentioned; who are certainly not rendered weaker than their English fellow-subjects by their freer use of vegetable aliment. The Negroes, whose great bodily powers are well known, feed chiefly on vegetable substances; and the same is the case with the South-Sea Islanders, whose agility and strength were so great, that the stoutest and most expert English sailors had no chance with them in wrestling and boxing.

The representations of the Pythagoreans respecting the noxious and debilitating effects of animal food, are, on the other hand, the mere offspring of imagination. We have not the shadow of a proof, unless we admit Ovid's Metamorphoses and other poetical compositions, that this state of innocence, of exalted temperance, of entire abstinence from flesh, of perfect tranquillity, of profound peace, ever existed, or that it is more than a fable, designed to convey moral instruction. If the experience of every individual were not sufficient to convince him that the use of animal food is quite consistent with the greatest strength of body and most exalted energy of mind, this truth is proclaimed by the voice of all history. A few hundreds of Europeans hold in bondage the vegetable-eating millions of the East. If the Romans, in their earliest state, employed a simple vegetable diet, their glorious career went on uninterruptedly after they had become more carnivorous: we see them winding their way, from a beginning so inconsiderable that it is lost in the obscurity of fable, to the empire of the world: we see them, by the power of intellect, establishing that dominion, which they had acquired by the sword, and producing such compositions in poetry, oratory, philosophy, and history, as are at once the admiration and despair of succeeding ages: we see our own countrymen rivalling them in arts and in arms, exhibiting no less signal bravery in the field and on the ocean; and displaying in a Milton and Shakspeare, in a Newton, Bacon, and Locke, in a Chatham, Erskine, and Fox, no less mental energy. Yet, with these proofs before their eyes, men are actually found who would have us believe on the faith of some insulated, exaggerated, and misrepresented facts; and still more miserable hypotheses, that the developement, form, and powers of the body are impaired and lessened, and the intellectual and moral faculties injured and perverted, by animal food.

On this subject of diet, a question naturally presents itself, whether man approaches most nearly to the carnivorous or herbivorous tribes in his structure? What kind of food should we assign to him if we judged from his organization merely, and the analogy it presents to that of other mammalia? Physiologists have usually represented that our species holds a middle rank, in the masticatory and digestive apparatus, between the flesh-eating and the herbivorous animals;—a statement which seems rather to have been deduced from what we have learned by experience on this subject, than to result fairly from an actual comparison of man and animals.

The molar teeth, being the instruments employed in dividing and preparing the food, must exhibit, in figure and construction, a relation to the nature of the aliment. They rise, in the true carnivora, into sharp-pointed prominences; and those of the lower shut within those of the upper jaw;—when the series is viewed together, the general outline may be compared to the teeth of a saw. These animals are also furnished with long, pointed, and strong cuspidati or canine teeth, which are employed as weapons of offence and defence, and are very serviceable in seizing and lacerating their prey; they constitute in some animals, as the lion, tiger, &c. very formidable weapons. The herbivorous animals are not armed with these terrible canine teeth; their molares have broad flat surfaces, opposed in a vertical line to each other in the two jaws. Plates of enamel are intermixed with the bone of the tooth in the latter; and, as its superior hardness makes it wear less rapidly than the other textures of the teeth, it appears on the grinding surface in rising ridges, which must greatly increase the triturating effect. In carnivorous animals the enamel is confined altogether to the surface of the teeth.

The articulation of the lower jaw differs in the two cases as much as the structure of the teeth. In the carnivora it can only move backwards and forwards; all lateral motion being precluded by the rising edges of the glenoid cavity: in the herbivora it has, moreover, motion from side to side. Thus we observe, in the flesh-eaters, teeth calculated only for tearing, subservient, in part at least, to the procuring of food, as well as to purposes of defence; and an articulation of the lower jaw, that precludes all lateral motion. In those which live on vegetables, the form of the teeth and the nature of the joint are calculated for the lateral or grinding motion. The former, having rudely torn and divided the food, swallow it in masses, while in the latter it undergoes considerable comminution before it is swallowed. The teeth of man have not the slightest resemblance to those of the carnivorous animals, except that their enamel is confined to the external surface. He possesses, indeed, teeth called canine, but they do not exceed the level of the others, and are obviously unsuited to the purposes which the corresponding teeth execute in carnivorous animals. The obtuse tubercles of the human molares have not the most remote resemblance to the pointed projections of these teeth in carnivorous animals: they are as clearly distinguished from the flat crowns with intermixed enamel of the herbivorous molares. In the freedom of lateral motion, however, the human inferior maxilla more nearly resembles that of the herbivora.

The teeth and jaws of man are in all respects much more similar to those of monkeys, than of any other animals. A skull, apparently of the orang-utang. in the Museum of the College, has the first set of teeth;—the number is the same as in man, and the form so closely similar, that they might easily be mistaken for human. In most other simiæ the canine teeth are much longer and stronger than in us; and so far these animals have a more carnivorous character. The points and ridges of the molares in simiæ are distinguished by their sharpness from the peculiar obtuse tubercles of the human molares.

The length and divisions of the alimentary canal are very different according to the kind of food. In the proper carnivorous animals the canal is very short;[*] the large intestine cylindrical, and the cæcum, not larger than the rest. The form of the stomach and the dispositions of its openings are calculated to allow a quick passage of the food. In the herbivora, the whole canal is long;[†] and there is either a complicated stomach, or a very large cæcum and a sacculated colon: the stomach, even where simple, is so formed as to retain the food for a considerable time.

In comparing the length of the intestines to that of the body, in man and other animals, a difficulty arises on account of the legs, which are included in the measurement of the body in the former, and not in the latter. The great depth of the cranium in man makes a further addition to the length of body, and thereby diminishes the proportion which the intestine bears to it. As our legs are half the height of the body, that should be reduced one half, when it is compared to that of animals measured from the head to the anus; or the length of the intestines may be doubled. When allowance is made for this circumstance, man will be placed nearly on the same line with the monkey race, and will be removed to a considerable distance from the proper carnivora. SOEMMERRING[*] states that the intestinal canal of man varies from three to eight times the length of the body. In TYSON'S chimpansé of twenty-six inches, the canal measured one hundred and fifty-nine inches, or about six times the length of the body.[†] In two sapajous and two monkeys, the intestines were respectively 62 and 96 inches; as the body is said in all to have been about 14 inches from the head to the anus, its proportion to the intestines will be in the former as 1 : $4\frac{6}{14}$, in the latter as 1 : $6\frac{12}{14}$.[‡] From these as well as other instances, it is apparent that the comparative length of the alimentary canal in simiæ, is less than in man.[||]

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[*] The length of the body, in a straight line from the snout to the anus, compared to that of the intestines, varies in the carnivora, according to CUVIER, from 1 : 3 to 1 : 5. 8; excepting the hyæna, where it is as 1 : 8.3. "Leç. d'Anat. Comp." iii. 450.

[†] In the ruminantia, the comparative lengths of the body and intestines vary between 1 : 11 and 1 : 28; in the solipeda, between 1 : 8 and 1 : 10 Ibid. 453 and 4

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[*] "De Corp. Hum. Fab." t. 6. p. 200.

[†] "Anat. of a Pygmie," p. 31.

[‡] "Memoires pour servir à l'Hist. Nat. des Animaux." 4to. part ii. p. 225.

[||] The body, from the snout to the anus, is to the intestines, in the

Gibbon (S. Lar,) as - - - -	1—8
Sajou (Cercopithecus) - - - -	1—6
Coaita (S. Paniscus) - - - -	1—6.3
Patas (S. Patas) - - - - -	1—6.5
Callitriche (S. Sabæa) - - - -	1—6
Malbrouk (S. Sinica) - - - -	1—6
Macaque (S. Cynomolgus) - - -	1—6.7
Magot (Barbary Ape, S. Inuus) - - -	1—5.4
Mandril (Ribbed-nose Baboon, S. Maimon) -	1—8.2

CUVIER, *Leç. d'Anat. Comp.* iii 448.

If we take the measurement of SOEMMERRING, and double the length of the intestines, in consequence of the legs being included, the proportion will be in man from 1 : 6 to 1 : 16. If the valvulæ conniventes are peculiar to man this peculiarity will be equivalent to a considerable increase of length in the canal.

The form of the stomach and cæcum, and the structure of the whole canal, are very much alike in man and the monkey kind. The orangs (S. satyrus, troglodytes, and gibbon) have the appendix vermifermis, which the others want.

Thus we find, that, whether we consider the teeth and jaws, or the immediate instruments of digestion, the human structure closely resembles that of the simiæ; all of which, in their natural state, are completely herbivorous.*

Man possesses a tolerably large cæcum, and a cellular colon, which, I believe, are not found in any carnivorous animal.

I do not infer from these circumstances that man is designed by nature to feed on vegetables, or that it would be more advantageous to him to adopt that diet. The hands and the arts of man procure for him the food which carnivorous animals earn by their teeth. The processes of cookery bring what he eats into a different state from that in which it is employed either by carnivorous or herbivorous animals. Hence the analogy in the modes of procuring and preparing food is too loose for us to place much confidence in the results of these comparative views. We must trust to experience alone for elucidating the great problem of diet: its decision has been long ago pronounced, and will hardly now be reversed.

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* Mr. ABEL's orang-utang appears to have naturally preferred fruit: he yielded on ship-board to the temptation of meat, and seems to have quickly become as carnivorous as his companions.

"His food in Java was chiefly fruit, especially mangostans, of which he was excessively fond. He also sucked eggs with voracity: and often employed himself in seeking them. On board ship, his diet was of no definite kind. He ate readily all kinds of meat, and especially raw meat; was very fond of bread, but always preferred fruits when he could obtain them." "Journey in China;" p. 325. At present (December 1818) his diet is vegetable, both from his own choice, and because it agrees much best with him.

Of some species of South-American simiæ it is incidentally mentioned by HUMBOLDT, that they live on fruits; "Recueil d'Obs. de Zoologie," &c. p. 208, of the S. trivirgata; p. 313, of the S. chiropotus; p. 318, of the S, melanocephala. It appears that some will occasionally take animal food, p. 320, and that the Titi (S. sciruea) will eat insects as well as fruits. p. 332. This little animal immediately distinguished, in some plates of natural history, the insects on which it had been accustomed to prey from other similar objects.

It is again a different inquiry, which diet is on the whole most conducive to health and strength? Which is best calculated to avert or remove disease? Whether errors in quantity or quality are most pernicious? The solution of these and other analogous questions can only be expected from experimental investigation. Mankind are so averse to relinquish their favorite indulgencies, and to desert established habits, that we cannot entertain very sanguine expectations of any important discovery in this department: we must add to this, that there are many other causes affecting human health, besides diet. Before venturing to draw any inferences on a subject beset with so many obstacles, it would be encessary to observe the effects of a purely animal and a purely vegetable diet on several individuals of different habits, pursuits, and modes of life; to note their state, both bodily and mental; and to learn the condition of two or three generations fed in the same manner.

Recurring to the subject which has been already adverted to—the extension of the great human family over the whole habitable globe, let us inquire a little into the causes of a phenomenon which so remarkably distinguishes man from all animals;—this power of existing and multiplying in every latitude, and in every variety of situation and climate. Does it arise from physical endowments, from any particular capabilities of the human organization,—from strength and flexibility of the animal machinery? or from the effects of human art and contrivance, in affording protection from extremes of heat and cold, from winds and rain, from vapours and exhalations, and the other destructive influences of local situation? Is it, in short, the result of physical constitution, or of reason. I think that both these causes are concerned;—that the original source of an attribute, which so strikingly characterizes our species, is to be sough in the properties of the human frame; and that this original power of the bodily fabric is assisted and fully developed by the mental prerogatives of man.

In what way do the Greenlander, the Eskimau, and the Canadian,* employ remarkable talents or invention to protect themselves against the cold? They brave the winter with open breast and uncovered limbs; and devour their whales and seals, drest, raw, or putrid. The Negro† is healthy and strong under a vertical sun, with the soles of his feet bare on the burning sands. On the other hand, the fox, the beaver, the marmot, and the hamster, seek the shelter of dwellings which they dig for themselves. In this comparison, in respect to protection from external influences, man enjoys no peculiar privilege. The mind, indeed, employs the excellent structure of the body, lifts man above the rest of the creation, accommodates him to all places, gives him iron, fire and arms, furs and screens from the sun, &c.; but, with all this, could never make him what he now is, the inhabitant of all climates, if he did not possess the most enduring and flexible corporeal frame. The lower animals, in general, have no defence against the evils of a new climate, but for the force of nature. The arts of human ingenuity furnish a defence against the dangers that surround our species in every region. Accordingly, we see the same nation pass into all the climates of the earth; reside whole winters near the pole; plant colonies beneath the equator; pursue their commerce, and establish their factories, in Africa, Asia, America. They can equally live under a burning sky and on an ice-bound soil, and inhabit regions where the hardiest animals cannot exist. Such changes indeed ought not to be hazarded suddenly and without precaution. The greatest evils that have arisen from change of climate have been occasioned by the presumption of health, that refuses to use the necessary precautions, or by the neglect of ignorance, that knows not what precautions to use. But when changes are gradually and prudently effected, habit soon accommodates the constitution to a new situation, and human ingenuity discovers the means of guarding against the dangers of every season and of every climate.

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* The Knisterneaux (situated north of the great lakes of Canada) often go to the chase in the severest frost, with ordinary slight clothing. MACKENZIE, "Travels in North-America;" Preliminary Hist. of the Fur Trade, p. 94.

Two Indians (Americans) slept on the snow in an ordinary light dress, when the thermometer at sun-rise was 40 below 0. The man suffered no inconvenience: the boy had his feet frozen, but they were recovered by cold water. LEWIS and CLARKE's *Travels*, 4to. p. 112.

† The women and children on the coast of Sierra Leone wear nothing on their heads, either in rain or sunshine. The mean heat is only 84°; but the thermometer rises in the sun to 130 or 140. "WINTERBOTTOM on the Native Africans," v. 1. p. 38.

The superiority of man appears more striking, when we contrast his universal extension with the narrow limits to which other animals, even the most anthropo-morphous, are confined. The whole tribe of simiæ, are nearly included within the tropics;[*] and no species has any considerable range even within these boundaries. No species is common to the Old and the New World; none, probably, to Asia and Africa. The orang-utang seems to be only found in the island of Borneo: and the chimpansé in a district of Africa. The gibbon is peculiar to the East Indies: and the proboscis monkey (simia rostrata) to the Sunda Isles.

The two most man-like monkeys (S. satyrus and troglodytes,) inhabiting small districts of warm regions, are very inconsiderable species in number: and thus offer a strong contrast to the thousand millions of the human species. They are subject to numerous diseases; lose all their vivacity, strength, and natural character; and perish, after lingering in a miserable way, when removed from their native abodes. An orang-utang brought to Paris, never recovered the exposure to cold in crossing the Pyrenees, and died at the age of fifteen months, with most of the viscera diseased and tuberculated.[†] The monkeys in general exist with difficulty in temperate countries, and can propagate only in warm climates. One which was impregnated in England, and attended with all possible care, brought forth a young one, which died immediately.[‡] Probably the species could not be continued here, with all the aid of art: and it certainly could not be effected, if the animals were wild. When they are introduced into the north (indeed into the greater part) of Europe, and carefully man-aged in their food, temperature, &c. they die very quickly; and in almost all cases, of disease in the viscera, particularly the lungs.

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[*] The simia inuus, or Barbary ape, has been transplanted from Africa to the rock of Gibraltar.

[†] *Annales du Muséum*, t. 16. p. 53.

[‡] HUNTER *on the Animal Economy*, p. 137.

Other animals, as the polar bear, naturally constructed for cold, cannot subsist in warmer regions. The dog accompanies man every where; but, with all the protection and assistance afforded by his master, degenerates, and undergoes remarkable changes, both of bodily structure and other properties, in very warm and very cold regions.

Other circumstances in the human economy correspond with this power of adaptation; such are the slow growth, long infancy, and late puberty of man. In no animal but man do the sutures of the cranium close, or the teeth come out at so late a period: none is so long before it can support the body on the legs, before it arrives at the complete adult stature and capacity for exercising the sexual functions. The long infancy of our species is compensated by proportionate longevity: no other of the mammalia, of corresponding size, enjoys so long a life as man. As the duration of life is in proportion to the time spent in arriving at the full growth, there is every reason to suppose that the monkeys fall very short of man in this respect: in this climate they are cut off so quickly, that we cannot form a judgment.

If we add to the foregoing circumstances, that man is not provided by nature with means of defence, and, consequently, requires assistance; and that his great distinctions, reason and speech, are only germs which are not developed by themselves, but are brought to maturity by extraneous assistance, cultivation, and education, we shall infer that he is designed, by nature, for social union. Such a condition appears more consonant to the structure, properties, and functions of our frame, even if it were not supported by the concurring voice of actual experience in all ages and nations, than the imaginary and most absurdly named "state of nature" of some philosophers. ROUSSEAU, the great apostle of this doctrine, informs us, in direct words, that the state of nature never has existed: and he sets aside all facts as foreign to the question. With these admissions before us, we are required to believe that we have degenerated from our natural state; that speech, society, arts, inventions, sciences, agriculture, commerce, property, civil government, and inequality of condition, have introduced all possible misery, and have debilitated our physical being; that we should live in the woods scattered and solitary to get food enough, protect life by flight and force, satisfy our desires, and sleep. BUFFON has reasoned so well on this subject, that I employ his words: "In this condition of nature, the first education requires an equal time as in the civilized state; for in both, the infant is equally feeble and equally slow in its growth, and, consequently, demands the care of its parents during an equal period. In a word, if abandoned before the age of three years, it would infallibly perish. Now, this necessary and long-continued intercourse between mother and child is sufficient to communicate to it all that she possesses; and though we should falsely suppose that a mother, in a state of nature, possesses nothing, not even the faculty of speech, would not this long intercourse with her infant produce a language? Hence, a state of pure nature, in which man is supposed neither to think nor speak, is imaginary, and never had an existence. This necessity of a long intercourse between parents and children produces society in the midst of a desert. The family understand each other by signs and sounds; and this first ray of intelligence, when cherished, cultivated, and communicated, expands, in process of time, into the full splendour of reason and intellect. As this habitual intercourse could not subsist so long, without producing mutual signs and sounds, these, always repeated, and gradually engraven on the memory of the child, would become permanent expressions. The catalogue of words, though short, forms a language, which will soon extend as the family augments, and will follow, in its improvement, the progress of society. As soon as society begins to be formed, the education of the infant is no longer individual; since the parents communicate to it, not only what they derive from nature, but likewise what they have received from their progenitors, and from the society to which they belong. It is no longer a communication between detached individuals, which, as in the animals, would be limited to the transmission of simple faculties, but an institution of which the whole species participates, and whose produce constitutes the basis and bond of society."*

The menstrual discharge is peculiar to women, and belongs to the whole sex in all countries; so that PLINY is right in regarding woman as the only "animal menstruale." "I know, indeed," says BLUMENBACH,† "that the same discharge has been ascribed to other animals, particularly of the order quadrumana. I have carefully inquired about all the female monkeys, which I have seen for these twenty years, either in menageries or carried about for public exhibition, and have found some of them liable to uterine hæmorrhage which observed no period, and was regarded by the more intelligent keepers as a circumstance arising from disease; although they acknowledged, that, in order to excite the admiration of their visitors, they often represent it as true menstruation."

The celebration of the rites of Venus is not confined in man, as in animals, to a particular season of the year.

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* BUFFON by WOOD, vol. 10. p. 30.

† *De G. H. Var. Nat.* p. 51, note.

CHAPTER VIII.

Faculties of the Mind—Speech—Diseases—Recapitulation.

All philosophers refer with one accord to the enjoyment of reason, as the chief and most important prerogative of the human species. If we inquire, however, more particularly into the meaning of this word, we shall be surprised to find what various senses different individuals affix to the same expression. According to some, reason is a peculiar faculty of the mind, belonging exclusively to man: others consider it as a more enlarged and complete developement of a power which exists, in a less degree, in other animals; some describe it as a combination of all the higher faculties of the mind; while others assert that it is only a peculiar direction of them. "Non nostrum inter hos tantas componere lites."

The subject may, perhaps, be more shortly and safely despatched by considering it *à posteriori*. In order to acquire a clear and satisfactory notion of the mental nature of man and animals, it would be necessary for us to have as complete a knowledge of their internal movements, as we have of our own. But, as it is impossible to know what passes within them, or how to rank and estimate their sensations, in relation to those of man, we can only judge by comparing the effects which result from the natural operations of both.

Let us, therefore, consider these effects: and, while we acknowledge all the particular resemblances, we shall only examine some of the most general distinctions. The most stupid man is able to manage the most alert and sagacious animal: he governs it, and makes it subservient to his purposes. This he effects, not so much by bodily strength or address, as by the superiority of his intellectual nature. He compels the animal to obey him, by his power of projecting and acting in a systematic manner. The strongest and most sagacious animals have not the capacity of commanding the inferior tribes, or of reducing them to a state of servitude. The stronger, indeed, devour the weaker; but this action implies an urgent necessity only, and a voracious appetite; qualities very different from that which produces a train of actions all directed to one common design. If animals be endowed with this faculty, why do not some of these assume the reins of government over others, and force them to furnish their food, to watch for them, and to relieve the sick or wounded? But among animals there is no mark of subordination, nor the least trace of any of them being able to recognize or feel a superiority in his nature above that of other species. We should therefore conclude, that all animals are in this respect of the same nature, and that the nature of man is not only far superior, but likewise of a very different kind from that of the brute.

Thrown on the surface of the globe, weak, naked, and defenceless, man appeared created for inevitable destruction. Evils assailed him on every side; the remedies remained hidden. But he had received from his Creator the gift of inventive genius, which enabled him to discover them. His exertions were roused by the various wants of food, clothing, and dwelling,—by the infinite variety of climate, soil, and other circumstances:—

——Pater ipse colendi
Haud facilem esse viam voluit; primusque per artem
Movit agros; curis acuens mortalia corda.

This prerogative of invention seemed so important in the earlier periods of society, that it has been honored with divine worship, as the Thoth of the Egyptians, the Hermes of the Greeks.

"The first savages collected in the forests a few nourishing fruits, a few salutary roots, and thus supplied their most immediate wants. The first shepherds observed that the stars move in a regular course, and made use of them to guide their journeys across the plains of the desert. Such was the origin of the mathematical and physical sciences.

"Once convinced that it could combat nature by the means which she herself afforded, genius reposed no more; it watched her without relaxation; it incessantly made new conquests over her, all of them distinguished by some improvement in the situation of our race.

"From that time, a succession of conducting minds, faithful depositories of the attainments already made, constantly occupied in connecting them, in vivifying them by means of each other, have conducted us, in less than forty ages, from the first essays of rude observers, to the profound calculations of Newton and La Place, to the learned classifications of Linneus and Jussieu. This precious inheritance, perpetually increasing, brought from Chaldea into Egypt, from Egypt into Greece, concealed during ages of disaster and darkness, recovered in more fortunate times, unequally spread among the nations of Europe, has every where been followed by wealth and power; the nations which have reaped it, are become the mistresses of the world; such as have neglected it, are fallen into weakness and obscurity."[*]

Man has made tools for assisting his labor; and hence Franklin sagaciously defined him a "tool-making animal:" he has formed arms and weapons; he has devised various means of procuring fire. Lastly, "The most noble and profitable invention of all others was that of speech; whereby men declare their thoughts one to another for mutual utility and conversation, without which there had been amongst men neither commonwealth nor society, no more than amongst lions, bears, and wolves,"[†] This is a most important characteristic of man; since it is not born with him, like the voices of animals, but has been framed and brought into use by himself, as the arbitrary variety of different languages incontestably proves.

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[*] Cuvier; "Reflections on the Progress of the Sciences, &c." read at the Royal Institute of France, April 24, 1816.

[†] Hobbes; "Leviathan."

Man exhibits, by external signs, what passes within him; he communicates his sentiments by words; and this sign is universal. The savage and the civilized man have the same powers of utterance; both speak naturally, and are equally understood. It is not owing, as some have imagined, to any defect in their organs, that animals are denied the faculty of speech. The tongue of a monkey is as perfect as that of a man: CAMPER asserts that the laryngeal pouch renders it impossible for the orang-utang to speak. I do not clearly understand how this is ascertained; but allowing its truth, there are other monkeys who have not this pouch, and yet cannot speak.

Several animals may be taught to pronounce words, and even to repeat sentences; which proves clearly that the want of speech is not owing to any defect in their organs: but to make them conceive the ideas which these words express, is beyond the power of art: they articulate and repeat like an echo or machine.

Language implies a train of thinking; and for this reason brute animals are incapable of speech: for, though their external senses are not inferior to our own, and though we should allow some of them to possess a faint dawning of comparison, reflection, and judgment, it is certain that they are unable to form that association of ideas in which alone the essence of thought consists.

The possession of speech, therefore, corresponds to the more numerous, diversified, and exalted intellectual and moral endowments of man, and is a necessary aid to their exercise and full developement. The ruder faculties and simple feelings of animals do not require such assistance. The natural language of inarticulate sounds, gestures, and actions, suffices for their purposes. The wonderful discovery of alphabetical writing, and the invention of printing, complete the benefits derived from the noble prerogative of speech.

With the operations of animals,—who always perform the same work in the very same manner; the execution of any individual being neither better nor worse than that of any other; in whom the individual, at the end of some months, is what he will remain through life, and the species, after a thousand years, just what it was in the first year,—contrast the results of human industry and invention, and the fruits of that perfectibility which characterizes both the species and individual. By the intelligence of man the animals have been subdued, tamed, and reduced to slavery: by his labours marshes have been drained, rivers confined, their cataracts effaced, forests cleared, and the earth culuvated. By his reflection, time has been computed, space measured, the celestial motions recognised and represented, the heavens and the earth compared. He has not merely executed, but has executed with the utmost accuracy, the apparently impracticable tasks assigned him by the poet:—

> Go, wondrous creature! mount where science guides;
> Weigh air, measure earth, and calculate the tides.

By human art, which is an emanation of science, mountains have been overcome, and the seas have been traversed; the pilot pursuing his course on the ocean, with as much certainty as if it had been traced for him by engineers, and finding at each moment the exact point of the globe on which he is, by means of astronomical tables. Thus nations have been united; and a new world has been discovered, opening such a field for the unfettered and uncorrupted energies of our race, that the senses are confused, the mind dazzled, and judgment and calculation almost suspended by the grandeur and brightness of the glorious and interminable prospects. The whole face of the earth at present exhibits the works of human power, which, though subordinate to that of nature, often exceeds, at least, so wonderfully seconds her operations, that, by the aid of man, her whole extent is unfolded, and she has gradually arrived at that point of perfection and magnificence in which we now behold her.

In the point of view which I have just considered, man stands alone: his faculties, and what he has effected by them, place him at a wide interval from all animals,—at an interval which no animal hitherto known to us can fill up. The manlike monkey, the almost reasonable elephant, the docile dog, the sagacious beaver, the industrious bee, cannot be compared to him. In none of these instances is there any progress either in the individuals or the species.

In most of the feelings of which other individuals of the species are the subjects, and in all which come under the denomination of moral sentiments, there is a marked difference between man and animals, and a decided inferiority of the latter. The attachment of the mother to the offspring, so long as its wants and feebleness require her aid and defence, seems as strong in the animal as in the human being, and bears equally in both, the characters of actions termed instinctive. Its duration is confined in the former case, even in social animals, to the period of helplessness; and the animal instinct is not succeeded, as in man, by that continued intercourse of affection and kind offices, and those endearing relations, which constitute the most exalted pleasures of human life.

Of courage, the animal kingdom offers many examples; and the moralists have celebrated the attachment of the dog to his master. It may be doubted whether he can find any instance of such feeling between animals themselves, excepting some cases of sexual unions. In general, they seem entirely destitute of sympathy with each other, indifferent to each other's sufferings or joys, and unmoved by the worst usage or acutest pangs of their fellows. Indeed, if we except some associated labours in the insect class, principally referring to the continuation of the species, and securing a supply of food, and some joint operations of the male and female in the higher classes, animals seem entirely incapable of concert or co-operation for common purposes, of combining various exertions for the attainment of a common end. This appears to arise from the limited nature and extent of their knowing and reflecting powers; to which, probably, we must refer their incapability of conceiving moral relations.

Laughing and weeping are natural signs in man of certain mental affections, and probably are also peculiar to him; animals are not susceptible of the emotions or states of mind indicated by these external signs.

That many animals besides man secrete tears is well known; but whether they weep from grief, is doubtful: yet respectble witnesses have represented that they do so. Steller states this of the phoca ursina;* PALLAS, of the camel†; and HUMBOLDT, of a small American monkey.‡

Whether any animals express mirth or satisfaction by laughter is more doubtful, to say nothing of the other causes of smiling or laughter in our species. The fact has been asserted, for instance, by LE CAT, who says that he saw the chimpansé both laugh and weep.|| The orang-utang brought from Batavia by Mr. ABEL certainly never laughs: his keeper informs me that he has seen him weep a few times.

I have had occasion, in a previous lecture,§ to advert to these striking zoological phenomena, and to explain at some length the views which I entertain respecting their nature and cause. I consider the differences between man and animals, in propensities, feelings and intellectual faculties, to be the result of the same cause as that which we assign for the variations in other functions, viz. difference of organization; and that the superiority of man, in rational endowments, is not greater than the more exquisite,

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* "Nov Comm. Acad. Scient. Petrop. ii. 353." "Tandem, cum nos cum catulis abituros videret, simili more ut femella adeo largiter lacrymabat, ut totum pectus ad pedes usque lacrymis inundaret, quod et post gravia inflicta vulnera contingit: vel post gravem illatem injuriam, quam ulcisci nequit. Observavi phocas captas simila ratione lacrymari."

† When the camel will not suckle its young, which is very rare, the Mongols and the Daurian Tungooses have recourse to an expedient detailed by PALLAS, in which they employed a plaintive melody imitating the voice of the young animal. This elicits copious tears from the old one, and completely excites its maternal feelings. "Sammlungen Histor. Nachrichten üb, die Mongolischen Völkerschaften;" th. i. p. 177.

‡ The Titi of the Orinoco; saimiri, BUFFON, t. 15: simia sciurea, LINNEUS. "Leur physionomie est celle d'un enfant: même expression d'innocence, même sourire malin, même rapidité dans le passage de la joie à la tristesse. Les Indiens affirment que cet animal pleure comme l'homme, lorsqu'il éprouve du chagrin; et cette observation est très exacte. Les grands yeux du singe se mouillent de larmes à l'instant même qu'il marque de la frayeur ou une vive inquietude." "Recueil d'Observations de Zoologie et d'Anatomie comparee; t. 1. p. 333.

|| "Traite de l'Existence du Fluide des Nerfs;" p. 35.

§ LECT. IV.; p. 90 and following.

complicated, and perfectly developed structure of his brain, and particularly of his ample cerebral hemispheres, to which the rest of the animal kingdom offers no parallel nor even any near approximation,is sufficient to account for. That the senses of man and of other animals will not explain all their varied and wonderful mental phenomena; and that the superiority of man can by no means be deduced from any pre-eminence in this part of his construction, are truths too obvious to require further notice.

Some modern inquirers have gone beyond this general statement; and have ventured to particularize, in the brains of animals and of man, the organ or residence of each propensity, feeling and intellectual power. I cannot pronounce on the accuracy and completeness of the mental and cerebral survey executed by Messrs. GALL and SPURZHEIM; nor pretend to judge of the exactness and fidelity with which the numerous positions are marked down in their very complete and well filled map of the brain. They appeal to observation for the confirmation or refutation of their statements; but my observations are not numerous or varied enough for these purposes. No one can refuse to them the merit of patient inquiry, careful observation, and unprejudiced reflection. They have performed the useful service of rescuing us from the trammels of doctrines and authorities, and directing our attention to nature; her instructions cannot deceive us. Whether the views of GALL and SPURZHEIM may be verified or not, our labors in this direction must be productive, must bring with them collateral advantages. Hence they may be compared to the old man in the fable, who assured his sons, on his deathbed, that a treasure was hidden in his vineyard. They began immediately to dig over the whole ground in search of it; and found, indeed, no treasure; but the loosening of the soil, the destruction of the weeds, the admission of light and air, were so beneficial to the vines, that the quantity and excellence of the ensuing crop were unprecedented.

The diseases peculiar to man may be deemed a more fit subject for pathology than natural history; but, as these unnatural phenomena arise out of the natural organization and habit of the body, and the dispositions of the animal economy, they cannot be entirely passed over in this discussion.

While the causes of disease in general are so obscure, and the exact series of phenomena has been ascertained in so few instances, it is hazardous to set down any particular affections as belonging exclusively to man: other animals might be affected, if exposed to the same causes. Those in a wild state have very few and simple diseases, if any: domesticated ones have several; and they are more numerous in proportion as the subjugation is more complete, and the way of life differs more widely from the natural one. The diseases of our more valuable domestic animals are sufficiently numerous to employ a particular order of men; and the horse alone has a distinct set to his own share. The miserable canary-birds seem to be equally in want of professional assistance; for, in the list of disorders to which they are subject, we find inflammation of the bowels, asthma, epilepsy, chancres of the bill, and scabs.* In man, the most artificial of all animals, the most exposed to all the circumstances that can act unfavorably on his frame, diseases are the most numerous; and so abundant and diversified, as to exhaust the ingenuity of the nosologist, and fatigue the memory of the physician. Perhaps nosological catalogues would afford the most convincing argument that man has departed from the way of life to which nature had destined him; unless, indeed, it should be contended that these afflictions are a necessary part of his nature, a distinction from animals, of which he will not be very likely to boast.

The accumulation of numbers in large cities, the noxious effects of impure air, sedentary habits, and unwholesome employments;—the excesses in diet, the luxurious food, the heating drinks, the monstrous mixtures, and the pernicious seasonings, which stimulate and oppress the organs,—the unnatural activity of the great cerebral circulation, excited by the double impulse of our luxurious habits and undue mental exertions, of the violent passions which agitate and exhaust us, the anxiety, chagrin, and vexation, from which few entirely escape, and then re-acting on and disturbing the whole frame;—the delicacy and sensibility to external influences, caused by our heated rooms, warm clothing, inactivity, and other indulgences, are so many fatal proofs that our most grievous ills are our own work, and might be obviated by a more simple and uniform way of life. Our associates of the animal kingdom do not escape the influence of such causes. The mountain shepherd and his dog are equally hardy, and form an instructive contrast with a nervous and hysterical fine lady, and her lap-dog;—the extreme point of degeneracy and imbecility of which each race is susceptible.

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* Buffon by Wood; v. 14. p. 87.

The observations of HUMBOLDT confirm the position, that individuals, whose bodies are strengthened by healthy habits in respect to food, clothing, exercise, air, &c. are enabled to resist the causes which produce disease in other men. He points to us the Indians of New Spain as a set of peaceful cultivators, accustomed to uniform nourishment, almost entirely of a vegetable nature, that of their maize and cereal gramina. "They* are hardly subject to any deformity. I never saw a hunch-backed Indian: and it is extremely rare to see any who squint, or who are lame in the arm or leg. In the countries where the inhabitants suffer from the goître, this affection of the thyroid gland is never observed among the Indians, and seldom among the Mestizoes.†

He repeats the same testimony very strongly concerning various tribes in South America; as the Chaymas, Caribs, Muyscas, and Peruvian Indians.‡

WINTERBOTTOM|| says that he never saw, nor heard of a case of hare-lip among the native Africans. But he adds, that ATKINS mentions a case seen by himself.

The comparison of diseases is difficult; since the study of nosology in brutes must be exposed, by its very nature, to very serious obstacles. The diseases in the following list, derived from BLUMENBACH, may be considered in all probability as peculiar to man.

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* "Political Essay on the Kingdom of New Spain;" v. 1. p. 152.

† The offspring of an European and an American.

‡ *Personal Narrative*, iii. 233.

|| *Account of the Native Africans*, ii. 224.

Nearly all the exanthemata; at least variola,[*] morbilli, scarlatina, miliaria, petechiæ, pestis.

Of the hemorrhagies, epistaxis;—hemorrhoides, menorrhagia.

Nervous affections.—Hypochondriasis; hysteria; mental affections properly so called, as mania, melancholia, nostalgia; probably also satyriasis, and nympho-mania. Cretinismus.

Cachexiæ.—Rachitis; scrofula;[†] lues venerea. Podagra, lepra, and elephantiasis,

Local diseases.—Amenorrhœa; cancer; chlorosis; hernia congenita; The various kinds of prolapsus, particularly that congenital one of the urinary bladder. Herpes; tinea capitis.

The two kinds of lice that infest our species, have not been found on any other animal. Whether the human intestinal worms are all distinct species, peculiar to man, I do not know.

I recapitulate the characters of man, discussed in the six preceding chapters, that the proofs of his constituting a distinct and separate species may be brought together in one view:—

1. Smoothness of the skin, and want of natural offensive weapons, or means of defence.
2. Erect stature; to which the conformation of the body in general, and that of the pelvis, lower limbs, and their muscles in particular, are accommodated.
3. Incurvation of the sacrum and os coccygis; and consequent direction of the vagina and urethra forwards.
4. Articulation of the head with the spinal column by the middle of its basis, and want of ligamentum nuchæ.
5. Possession of two hands, and very perfect structure of the hand.
6. Great proportion of the cranium (cerebral cavity) to the face (receptacles of the senses and organs of mastication.)
7. Shortness of the lower jaw, and prominence of its mental portion.

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[*] A monkey at Amsterdam contracted a local ulcer from the contagion of small pox, but had no fever. Blumenbach, *De. G. H. Var. Nat.* p. 59.

[†] Monkeys perish in those climates of affections very much resembling scrofula. The lymphatic glands, lungs, and other viscera, are diseased; [illegible]y tuberculated; and the bones are often affected.

8. Want of the intermaxillary bone.
9. Teeth all of equal length, and approximated: inferior incisors perpendicular.
10. Great developement of the cerebral hemispheres.
11. Great mass of brain, in proportion to the size of the nerves connected with it.
21. Greater number and developement of mental faculties, whether intellectual or moral.
13. Speech.
14. Capability of inhabiting all climates and situations; and of living on all kinds of food.
15. Slow growth; long infancy: late puberty.
16. Menstruation; exercise of the sexual functions not confined to particular seasons.

SECTION II.

ON THE VARIETIES OF THE HUMAN SPECIES.

◆

CHAPTER I.

Statement of the subject—Mode of Investigation—The Question cannot be settled from the Jewish Scriptures, nor from other Historical Records.—The Meaning of Species and Variety in Zoology; Nature and Extent of Variation.—Breeding, as a Criterion of species.—Criterion of Analogy.

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The differences which exist between inhabitants of the different regions of the globe, both in bodily formation and in the faculties of the mind, are so striking, that they must have attracted the notice even of superficial observers. With those forms, proportions, and colors, which we consider so beautiful in the fine figures of Greece, contrast the woolly hair, the flat nose, the thick lips, the retreating forehead and advancing jaws, and black skin of the Negro; or the broad square face, narrow oblique eyes, beardless chin, coarse straight hair, and olive color of the Calmuck. Compare the ruddy and sanguine European with the jet-black African, the red man of America, the yellow Mongolian, or the brown South-Sea Islander; the gigantic Patagonian, to the dwarfish Laplander; the highly civilized nations of Europe, so conspicuous in arts, science, literature, in all that can strengthen and adorn society, or exalt and dignify human nature, to a troop of naked, shivering, and starved New Hollanders, a horde of filthy Hottentots, or the whole of the more or less barbarous tribes that cover nearly the entire continent of Africa. Are these all brethren? have they descended from one stock? or must we trace them to more than one?—and if so, how many Adams must we admit?

The phenomena are capable of solution in either of these ways:—We may suppose that different kinds of men were originally created; that the forms and properties, of which the contrast now strikes us so forcibly, were impressed at first on the respective races; and consequently that the latter, as we now see them, must be referred to different original families, according to which supposition they will form, in the language of naturalists, different *species*. Or, we may suppose that one kind of human beings only was formed in the first instance; and account for the diversity, which is now observable, by the agency of the various physical and moral causes to which they have been subsequently exposed; in which case they will only form different *varieties* of the same species.

The question belongs to the domain of natural history and physiology; we must be contented to proceed in our examination in the slow and humble, but sure method of observation. It will be necessary to ascertain carefully all the differences that actually exist between the various races of men; to compare these with the diversities observed among animals; to apply to them all the lights, which human and comparative physiology can supply; and to draw our inferences concerning their nature and causes, from all the direct information, and all the analogies, which these considerations may unfold.

In the first place, we must dismiss all argument *à priori*, as entirely inapplicable to the subject. One philosopher tells us, that Nature does nothing in vain; that she would not give herself the trouble to create several different stocks, when one family would be sufficient to colonize the world in a short space of time. Another, with equal speciousness, dilates on the absurdity of supposing that immense regions should remain for ages an unoccupied and dreary waste, while the offspring of a single pair was slowly extending over the face of the earth: or that such an admirable variety of islands should display their charms in vain, till a shipwreck or some other casual occurrence might supply them with inhabitants. He shows how much more consonant to the wisdom and benevolence of the Deity it would be, for the earth to have teemed from the first moment of its production with trees and fruits, and to have been occupied by all kinds of animals, suited to each soil and sky. I cannot too strongly reprobate such idle declamation, which, by withdrawing our attention from the right method of investigation, inevitably tends to perpetuate our ignorance of nature. Dr. PRICHARD, in his excellent inaugural discourse on this subject, has so well exposed the futility of such arguments, that I have great pleasure in quoting his words. "Hæc quanquam satis speciosa videantur, omnia ut fit plerumque in hujusmodi argumentationibus fluxa et incerta sunt. Qui magna loquuntur, tanquam ipsi ex Dei concilio descendissent, neque ut humiles ministros, et naturæ interpretes oportet, raro lumine quantulocunque ejus abdita illustrant. Ille quiaem dixerunt quomodo mundum constituissent, si hoc eorum curationi fuisset commissum; sed qua ratione re ipsa constitutus sit, talibus auspiciis, et latet, et semper latebit." p. 5.

Most persons, when they first turn their attention to the subject, and select for contemplation strongly-marked specimens of the varieties of man, will be inclined to adopt the supposition of originally distinct species. This is the case with VOLTAIRE,[*] who has recurred to the subject repeatedly in his various writings, and has expressed himself very positively, ridiculing the idea of referring such different beings as the Negro, European, African, Albino, &c. to the same original. "Il n'est permis qu'à un aveugle de douter que les blancs, les Négres, les Albinos, les Hottentots, les Lappons, les Chinois les Américains, soient des races entièrment différentes."[*] He says of the Negroes, "Leurs yeux ronds, leur nez épaté, leurs lèvres toujours grosses, leurs oreilles différemment figurées, la laine de leur tête, la mesure même de leur intelligence, mettent entr'eux et les autres espèces d'hommes des différences prodigieuses. Et ce qui démontre qu'ils ne doivent point cette différence à leur climat, c'est que des Négres et des Négresses transportés dans les pays les plus froids, y produisent toujours des animaux de leur espèce, et que les mulâtres ne sont qu'une race bâtarde d'un noir et d'une blanche, ou d'un blanc et d'une noire."[†].

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[*] *Histoire de Russie sous Pierre le Grand*; ch. 1. *Essai sur les Mœurs*; introduction; and chap. 143. *Dictionnaire Philosophique*, *art. Homme*, *Lettres d'Amabed*, let. 4. *Traité de Métaphysique*, chap. i. In the place last quoted, he gives a short but lively and interesting sketch of the different races of men, and of the distinction between man and animals.

To these, which are in truth well-founded remarks, although in favor of what I think will appear to be the wrong opinion on the subject, he adds others of a less correct description; enumerating, as proofs of distinct species, the beardlessness of the Americans, the black nipples of the Samoiede women, and "le tablier que la nature a donné aux Caffrees, et dont la peau lâche et molle tombe du nombril sur les cuisses."[†]

I am not surprised at the view which Voltaire has taken of the question; for first appearances strongly favor his opinion. This witty and charming writer, who delights us with his various excellencies in so many departments of literature and philosophy, may be well excused for not having possessed sufficient zoological and physiological knowledge to guide his judgment on such a point. Indeed the progress of science and discovery, and the more accurate accounts of various people procured by modern travellers, have given us advantages which he did not possess. We must not, however, follow his example in selecting two or three prominent contrasts, and considering them alone: such partial and insulated views cannot lead to any satisfactory results. It is necessary to examine, not only the more marked differences, but also the numerous gradations by which opposite extremes are in all cases connected and gradually brought together: it is also necessary to cast our view over the animal kingdom at large, and to compare with man the various living beings which more nearly resemble him. The whole proceeding must be governed by the principles of general physiology.

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[*] *Ess. sur les Mœurs.* [†] Ibid. [†] Ibid.

The disquisition will perhaps be deemed superfluous by those who regard the Hebrew Scriptures as writings composed with the assistance of divine inspiration, and therefore commanding our implicit assent; who receive, as a narrative of actual events, authenticated by the highest sanction, the account contained in Genesis of the formation of the world, the creation of man and animals, and their dispersion over the face of the globe.

That Mosaic account does not however make it quite clear that the inhabitants of all the world descended from ADAM and EVE.[*] Moreover, the entire or even partial inspiration of the various writings comprehended in the Old Testament has been and is doubted by many persons, including learned divines, and distinguished oriental and biblical scholars. The account of the creation, and subsequent events, has the allegorical figurative character common to eastern compositions; and it is distinguished among the cosmogonies by a simple grandeur and natural sublimity, as the rest of these writings are by appropriate beauties in their respective parts, not inferior to those of any human compositions.

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[*] We are told, indeed, that "ADAM called his wife's name EVE, because she was the mother of all living." But, in the first chapter of Genesis, we learn that GOD created man male and female; and this seems to have been previously to the formation of EVE, which did not take place until after the Garden of Eden had been prepared. Again, we learn in the fifth chapter of Genesis, that "in the day that GOD created man, in likeness of GOD made he him: male and female created he them: and blessed them, and called their name ADAM, in the day when they were created." We find also that CAIN, after slaying his brother, was married, although no daughters of EVE are mentioned before this time. "CAIN went out from the presence of the Lord, and dwelt in the land of Nod, on the east of Eden. And CAIN knew his wife, and she conceived and bare ENOCH." Indeed it is said (ch. v. 4,) that "the days of ADAM, after he had begotten SETH, were eight hundred years, and he begat sons and daughters." This, it should seem, took place after the birth of SETH, and consequently long after CAIN had his wife; for SETH was not born till after the death of ABEL. If CAIN had sisters prior to that period, from amongst whom he might have taken a wife, Moses has not noticed them.

To the grounds of doubt respecting inspiration, which arise from examination of the various narratives, from knowledge of the original and other oriental languages, and from the irreconcilable opposition between the passions and sentiments ascribed to the Deity by Moses, and that religion of peace and love unfolded by the Evangelists, I have only to add, that the representations of all the animals being brought before Adam in the first instance,* and subsequently of their being all collected in the ark,† if we are to understand them as applied to the living inhabitants of the whole world, are zoologically impossible.

The collection of living beings in one central point, and their gradual diffusion over the whole globe, may not be greatly inconsistent with what we know of our own species, and of the few more common quadrupeds, which accompany us in our various migrations, and are able to sustain with us great varieties of climate, food, situation, and all external influences.

But when we extend our survey to the rest of the mammalia, we find at all points abundant proofs of animals being confined to particular situations, and being so completely adapted, by their structure and functions, by their whole organization, economy, and habits, to the local peculiarities of temperature, soil, food, &c. that they cannot subsist where these are no longer found. In proportion as our knowledge of species becomes more exact, the proofs of this locality are rendered stronger; and the examples of admirable conformity between the organic capabilities of animals, and the circumstances of the regions which they inhabit, are multiplied and strengthened.

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* "And out of the ground the Lord God formed every beast of the field, and every fowl of the air, and brought them to Adam to see what he would call them; and whatsoever Adam called every living creature, that was the name thereof.

"And Adam gave names to all cattle, and to the fowl of the air, and to every beast of the field." *Gen.* ii. 19. 20,

† "And of every livng thing of all flesh, two of every sort shalt thou bring into the ark, to keep them alive with thee; they shall be male and female.

"Of fowls after their kind, and of cattle after their kind, of every creeping thing of the earth after his kind; two of every sort shall come unto thee, to keep them alive," *Gen.* vi. 19, 20.

The peculiar adaptation of the camel to the sandy deserts in which he is placed, strikes the most cursory observer. The herds of antelopes and other ruminant animals, and great troops of solidungular quadrupeds, are not less suited to the boundless plains of Asia, and Africa; the vast assemblages of elk and buffalo, to the uninhabited wilds of America; the tiger, to the jungles and the thickets of the East Indies; and the troops of sapajous, with their prehensile tails, to the lofty forests of Guiana and Brazil.

Even when the external circumstances are nearly alike, remote regions are occupied in most cases by distinct genera or species. The lion, so common in Africa, is hardly found in Asia, while the tiger is peculiar to the latter: the elephants and rhinoceroses of these two quarters of the world are specifically distinct.

The instances of America, New Holland, and some other islands, afford unanswerable arugments against the creation of all animals in one spot. None of the mammalia of the southern hemisphere, the torrid zone, or even the two northern temperate regions, are common to the two continents. When the Spaniards landed in the New World, they did not find a single animal they were acquainted with; not one of the quadrupeds of Europe, Asia, or Africa. On the other hand, the puma,[*] the jaguar,[†] the tapir, the cabiai,[‡] the llama,[||] the vicugna[§] the sapajous, were creatures altogether new to them. No quadrupeds are found in both continents, except such as dwell north of the Baltic in the old, and of Canada in the new world; such, in short, as are capable of bearing the cold of those regions where the two continents approximate to each other.

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[*] Couguar (Felis discolor Linn.)

[†] Felis onça L. American tiger; nearly a match in size and strength for the royal tiger of Bengal.

[‡] Cavia capybara L.

[||] Camelus Llacma L., the camel of Peru, and the only beast of burden in the country at the time of the Spanish conquest, The guanaco is the wild llama.

[§] Paco: camelus vicunno, L., producing the fine soft and fawn-colored wool.

Here, indeed, we must guard against the mistakes which the inconsiderate application of the same names to animals really different, though more or less analogous to each other, might occasion. We read of American lions; but the creature so called (the puma) although a carnivorous animal, is widely different from the lion of Africa: the American monkeys again form a very distinct family, without any specific affinity to those of the old world.

A similar phenomenon was again experienced in our own times, on first exploring the coasts of New Holland and the adjacent isles. A dog was indeed found here; whether of the same species with those we are acquainted with, and introduced from the neighboring islands, is not perhaps yet clearly ascertained. This great southern continent contained no other mammiferous animals previously known to naturalists; but, on the contrary, it has furnished about forty species, altogether new, of which the kangaroos, the phascolomys,[*] the dasyuri, the pérameles, the flying phalangers,[†] the ornithorhynchi, and the echidnæ, have astonished zoologists by the novelty and singularity of their conformation, contrary to all the rules hitherto established, and at variance with all their systems.[‡] Even the island called VAN DIEMEN'S Land, although situated so near to New-Holland, and in some degree connected to it by intervening islands, has its own peculiar species.[||]

The orang utang is found only on the island of Borneo; and the makis are confined to that of Madagascar, while the neighboring continent of Africa has none of them, but numerous monkeys instead.

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[*] Wombat, Didelphis ursina of SHAW.

[†] Petaurus, SHAW.

[‡] CUVIER *Regne Animal;* on the order *marsupiaux;* t. i, p. 169, et suiv.

[||] "En effet, tous les animaux, que nous avons recueillis sur la terre de Diemen, et qu'on peut regarder comme plus particulièrement propres au sol, tels que les mammifères, les reptiles, &c. sont spécifiquement différens des animaux de la Nouvelle Hollande; la plupart même des espèces, qui peuplent ce continent n'existent pas sur la grande île qui l'avoisine." PERON *Voyage de Découvertes aux Terres Australes;* v. ii. p. 165.

Even marine animals are confined to particular situations, although it might appear so probable, *à priori*, that the waves and currents of the ocean would carry them into all situations, and the medium in which they live seems so favorable for their transportation. PERON and LE SUEUR assert that there is no *well-known animal* of the northern hemisphere, which is not specifically distinct from every other *equally well-known* of the southern; and that this is true even of those possessing the lowest and simplest organization.[*]

If all the difficulties connected with the facts just recited, and with the numerous analogous ones,[†] which every department of natural history could furnish, were removed, insurmountable obstacles would still be found to this hypothesis of the whole globe having received its supply of animals from one quarter. How could all living beings have been assembled in one climate, when many, as the white fox (isatis,) the polar bear, the walrus, the manati, can exist only in the cold of the polar regions, while to others the warmth of the tropics is essential? How could all have been supplied with food in one spot, since many live entirely on vegetables produced only in certain districts? How could many have passed from the point of assemblage to their actual abode, over mountains, through deserts, and even across the seas? How could the polar bear, to whom the ice of the frozen regions is necessary, have traversed the torrid zone? If we are to believe that the original creation comprehended only a male and a female of each species, or that one pair only was rescued from an universal deluge, the contradictions are again increased. The carnivorous animals must have soon perished with hunger, or have annihilated most of the other species.

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[*] "Personne plus que nous, il est permis de le dire, n'ai recueilli d'animaux de l'Hemisphere austral; nous les avons observés décrits, et figurés sur les lieux; nous en avons rapportes plusieurs milliers d'espèces en Europe; elles sont deposées dans le Muséum d'Histoire Naturelle de Paris. Que l'on compare ces nombreux animaux avec ceux de notre hémisphère, le probléme sera bientôt resolu, non seulement pour les especes d'une organisation plus parfaite, mais encore pour toutes celles qui sont beaucoup plus simples, et qui, sous ce rapport, sembleroient devoir être moins variees dans la nature. Qu'on examine, nous ne dirons pas les doris, les aplysies, les salpas, les néréides, les amphinomes, les amphitrites, et cette foule de mollusques et des vers plus composés qui se sont successivement offerts à notre observation: qu'on descende jusqu'aux holothuries, aux achnies, aux béroés, aux méduses; qu'on s'abaisse même, si l'on veut jusqu'à ces éponges informes, que tout le monde s'accord à regarder comme le dernier terme de la dégradation, ou plutôt de la simplicité de l'organisation animale; parmi cette multitude, pour ainsi dire effrayante, d'animaux antarctiques, on verra qu'il n'en est pas un seul qui se retrouve dans les mers boreales; et de cet examen bien réfléchi, de cette longue suite de comparaisons rigoureuses, on sera force de conclure, ainsi que nous avons dù nous-mêmes le faire, 'qu'il n'est pas une seule espèce d'animaux marins bien connue, qui, véritable cosmopolite, soit indistinctements propre à toutes les parties du globe.'"—Notice sur les Habitations des Animaux Marins; in the *Voyage aux Terres Australes*, t. ii. p. 348—9.

[†] Further illustrations of this important subject may be seen in Dr. PRICHARD's *Researches on the Physical History of Man*, chap. iii. sec. 2 and 3. ZIMMERMANN *Geographische Geschichte*, &c. RUDOLPHI *Beyträge zur Anthropologie und allgemeinen Naturgeschichte*, No. iii. and in the paper of PERON and LE SUEUR, already quoted.

Such an assumption, in short, is at variance with all our knowledge of living nature. Why should we embrace an hypothesis so full of contradictions?—to give to an allegory a literal construction, and the character of revelation; which is so much the less necessary here, because we do not follow the same rule in other points. The astronomer does not portray the heavenly motions, or lay down the laws which govern them, according to the statements in the Jewish Scriptures; nor does the geologist think it necessary to modify the results of experience according to the contents of the Mosaic writings.

I conclude, then, that the subject is open for discussion: and, at all events, if the descent of mankind from one stock can be proved independently of the Jewish books, the conclusion will tend collaterally to establish the authority of these ancient records.

It may still be inquired, whether history affords no data for determining this great problem; whether the earliest traditions and records may not enable us to trace the succession of the human race from its original downwards; or whether we may not be able to follow back particular tribes or nations to the period of their first descent or establishment. We soon find that these efforts are unavailing; that neither the annals nor the traditions of any people reach back to the remote ages when the various ramifications of the original stock—if there were any such—separated from each other, and took possession of the different countries where they are now settled. We cannot trace the branches of any such family, nor point out the time and manner in which they divided and spread over the face of the globe. Even among the most enlightened people, the period of authentic history is short, and every thing beyond that period is fabulous and obscure.

The Jewish annals, in which it is not always easy to separate and distinguish what ought to be received as literally true, although of very high antiquity, merely relate to the transactions of a small tribe, and some of their neighbors. The Indian and Chinese, also very ancient, are equally confined. The phrase "Græcia mendax" has long ago afforded a caution against placing much reliance on the early traditions transmitted by the Greeks.

In the introduction to his great work on language, ADELUNG* has summed up what history discloses to us on this subject; and, as it has an important reference to the present object of inquiry, I hope the length of the extract will be excused.

"Asia has been in all times regarded as the country where the human race had its beginning, received its first education, and from which its increase was spread over the rest of the globe.

"Tracing the people up to tribes, and the tribes to families, we are conducted at last, if not by history, at least by the traditions of all old people, to a single pair, from which families, tribes, and nations have been successively produced. The question has been often asked, What was this first family, and the first people descending from it? where was it settled? and how has it extended so as to fill the four large divisions of the globe? It is a question of fact, and must be answered from history. But history is silent; her first books have been destroyed by time; and the few lines preserved by MOSES are rather calculated to excite than to satisfy our curiosity.

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* *Mithridates, oder allgemeine Sprachenkunde*, &c. 1r. th. Berlin, 1806. 2r 3r. 4r. th. von J. S. VATER, Berlin, 1809—1817. a most important work in relation to the history of our species, and the affinities and migrations of various tribes

"In the first feeble rays of its early dawn, which are faintly perceived about 2000 years before the commencement of our present chronology, the whole of Asia, and a part of Africa, are already occupied with a variety of greater and smaller nations, of various manners, religion, and language. The warlike struggle is already in full activity: here and there are polished states, with various useful inventions, which must have required long time for their production, developement and extension The rest of the human race consists of wild hordes, occupied merely with pastoral pursuits, hunting, and robbery: thus a kind of slave-trade is seen in the time of Abraham. Soon after, a few weak glimmerings of light discover to us Europe in a similar state of population, from the Don to the Pillars of Hercules; here and there traces of culture, industry, and commerce; for instance, the amber trade in the Baltic, at least in the time of Homer, and that of the British tin. All this is perceived in remote obscurity, where only a few points of light occasionally shoot across, to show us the germs of future history, which is still profoundly silent respecting the time and place of such events. Nothing is left for us, but humbly to assume the garb of ignorance, to look round us in the great archives of nature, and see if there are any documents which may at least lead us to conjectures. Happily there are such.

"The present structure of the earth's surface teaches us, what Moses confirms, that it was formerly covered to a certain depth with water, which gradually lessened, from causes unknown to us, so that various spots became dry and habitable. The highest dry surface on the globe must, therefore, have been the earliest inhabited;—and here Nature, or rather her Creator, will have planted the first people, whose multiplication and extension must have followed the continual gradual decrease of the water.

"We must fancy to ourselves this first tribe endowed with all human faculties, but not possessing all knowledge and experience, the subsequent acquisition of which is left to the natural operation of time and circumstances. As nature would not unnecessarily expose her first-born and unexperienced son to conflicts and dangers, the place of his early abode would be so selected, that all his wants could be easily satisfied, and every thing essential to the pleasure of his existence, readily procured. He would be placed, in short, in a garden, or Paradise.

"Such a country is found in central Asia, between the 30th and 50th degrees of north latitude, and the 90th and 110th of east longitude (from Ferro): a spot which, in respect to its height, can only be compared to the lofty plain of Quito in South America. From this elevation, of which the great desert Cobi, or Shamo, is the vertical point, Asia sinks gradually to all the four quarters, The great chains of mountains, running in various directions, arise from it, and contain the sources of the great rivers which traverse this division of the globe on all sides—the Selinga, the Ob, the Lena, the Irtisch, and the Jenisey, in the north; the Jaik, the Jihon, the Jemba, on the west; the Amur and the Hoang-ho (or Yellow River) towards the east; the Indus, Ganges, and Burrampooter, on the south. If the globe was ever covered with water, this great table land must have first become dry, and have appeared like an island in the watery expanse. The cold and barren desert of Cobi would not, indeed, have been a suitable abode for the first people; but on its southern declivity we find Thibet, separated by high mountains from the rest of the world, and containing within its boundaries all varieties of air and climate. If the severest cold prevails on its snowy mountains and glaciers, a perpetual summer reigns in its valleys and watered plains. This is the native abode of rice, the vine, pulse, fruit, and all other vegetable productions, from which man draws his nourishment. Here, too, all the animals are found wild, which man has tamed for his use, and carried with him over the whole earth;—the cow,[*] the horse,* ass,† sheep,‡ goat,|| camel,§ pig, dog,¶ cat, and even the

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[*] To determine the original stock of our domestic animals is one of the most difficult undertakings in zoology. I know no data on which the ox-kind can be referred to any wild species in Asia. Cuvier has concluded, from a minute osteological inquiry, that the wild-ox (urus or bison of the Ancients; aurochs of the Germans,) formerly found throughout the greater part of temperate Europe, and still met with in the forests of Lithuania, of the Carpathian and Caucasian chains, is not, as most naturalists have supposed, the wild original of our cattle: but that the characters of the latter are found in certain fossile crania; whence he thinks it probable "that the primary race has been annihilated by civilization, like that of the camel and dromedary." *Des Animaux Fossiles*, v. 4, *Ruminans Fossiles*, p. 51.

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[*] Pallas, *Spicileg. Zool.* fasc. xi. p. 5, note b.

[†] Pallas, *Spicileg. Zool.* fasc. xi p. 5, note 6.

[‡] There are two or three wild species, nearly related to each other, which seem to have equal claims to be considered as the source of our sheep. Of these, the argali, found in the great mountains of Asia, strongly resembles the sheep. Pallas *Spicileg. Zool.* fasc. xi. tab. 1 & 2.

[||] The wild goat (ægagrus) is met with in the mountains of Persia, where it has the name of paseng or pasan (whence the term pasahr, corrupted into bezoar, applied to their intestinal concretions,) and probably elsewhere, even in the Alps of Europe. Cuvier, *Ménagerie du Muséum*, 8vo. v. 2. p. 177. The ibex (bouquetin) occupies the highest summits of the mountains of the old continent: that of Asia is described by Pallas, *Spic. Zool.* f. 11. p. 31, et seq. tab. iii. Another species inhabits the chain of Caucasus (capra Caucasica;) Guldenstædt, *Comment. Petrop.* 1779, pl. xvi. xvii.

[§] In opposition to the assertion of Buffon, who represents that the entire race is reduced to slavery, and who strangely regards the callosities of its chest and limbs as the result of its servile labors, Pallas reports, on the faith of the Bucharian merchants, and of the wandering nomades of Asia, that native wild camels are still found in the vast plains of the temperate part of this continent, and are distinguished from the domesticated animals by their superior size, spirit, and swiftness. The northern confines of India, and the deserts between it and China, seem to be the native abode of the Bactrian camel, or that with two protuberances. The wild camels about the Balchasch Lake and Bogdo Mountains are probably prodced from those which have been set at liberty by the Calmucks from religious motives. *Fascic.* xi. p. 4, note a.

[¶] Pallas seems fully convinced that the jackall, "copiosissimum in universo oriente animal," is the source of our dogs, which he closely resembles in manners and disposition, being also very like some breeds in size and figure. "Homini facillime adsuescit, nunquam, uti lupus et vulpes cicurati, infidi animi signa edens, lususve cruentans; canees non fugit, sed ardenter appetit, cum iisque colludit, ut plane nullum sit dubium cum iisdem generaturum, si tentetur experimentum. Vocem desiderii caninæ simillimam habet; homini cauda eodem modo abblanditur, et in dorsum provolvi atque manibus demulceri amat. Ipse coque ululatus ejus, cum latratu canum ejulabundo magnam habet analogiam. Ergo dubium vix esse puto, hominis speciem, in edem cum lupo aureo climate naturaliter inquilinam, antiquitus hujus catulis circuratis domesticos sibi educasse canes, quorum naturalis instinctus jam homini, quem feri non multum timent, amicus, et in venationem pronus erat." *Spicil. Zool.* fasc. xi. p. 1, note.

These opinions are confirmed by the statements of Guldenstædt, who found the cæcum and the teeth perfectly alike in the dog and jackall: it is not so in the wolf. The jackall makes water sideways; "odorat anum alterius; cohæret copula junctus." *Nov. Comment. Petrop.* v. 20. p. 459, tab. xi.

serviceable rein-deer,* his only attendant and friend in the icy deserts of the frozen polar regions. Close to Thibet, and just on the declivity of the great central elevation, we find the charming region of Cashmire, where great elevation converts the southern heat into perpetual spring, and where Nature has exerted all her powers to produce plants, animals, and man, in the highest perfection. No spot on the whole earth unites so many advantages; in none could the human plant have succeeded so well without any care."† This spot, therefore, seems to unite all the characters of Paradise, and to be the most appropriate situation in Asia for the birth-place of the human race.

Such is the general result of historical inquiry: it points out the East as the earliest or original seat of our species, the source of our domesticated animals, of our principal vegetable food, and the cradle of arts and sciences: but it does not furnish the means of deciding whether the globe has been peopled from one or more original stocks, nor enable us to trace satisfactorily the mode in which their dissemination has been accomplished.

Before entering on the immediate object of this section, it is necessary to consider what is the precise acceptation of the terms *species* and *variety* in zoology; what constitutes a species, and how varieties arise out of it.

Animals are characterized by fixed and definite external forms, which are transmitted and perpetuated by generation. The offspring of sexual unions is marked with all the bodily characters of the parents. However strong the impulse may be, which leads to the continuation of the species, there seems to be an equally powerful aversion to intercourse with those of other species. Hence, in the wild state, even the most nearly allied do not intermix; as, the hare and rabbit, the horse and ass; the different kinds of mice, or of rats. Constant and permanent difference, therefore, is the essential notion conveyed by the word *species;* and, provided it be invariably maintained, it is immaterial whether that difference be great or small. Thus the specific distinction between the black rat (mus rattus) and the brown or Norway rat (m. decumanus,) or between the domestic-mouse (m. musculus) and the field-mouse (m. arvalis,) is as perfect as between either of these and the elephant.

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* The rein-deer is only known at present in the coldest regions. ADELUNG could not, I think, have any sufficient authority for placing its origin in the region and climate which he here describes.

† ADELUNG: 1r. theil. *Einleitung*, p. 3—9.

By the reproduction of the same characters, and the aversion to union with other species, uniformity is maintained; and the lapse of ages produces no deviation from the original model. Animals are just the same now, as at any, even the remotest period of our acquaintance with them. The zoological descriptions of ARISTOTLE, composed twenty-two centuries ago, apply in all points to the individuals of the present time; and every incidental mention of animals, or allusion to their characters and properties, in the writings of historians, poets, and fabulists, confirms this identity of form and endowments. Every work of art, such as statues, paintings, sculptures; and the actual relics in tombs, mummies, &c.; all corroborate the proof.*

These remarks are chiefly applicable to wild animals, which remain in places most congenial to their nature; where the climate, seasons, air, soil, supply of food, correspond to their organization, economy, and wants. Some of these, however, are capable of enduring greater diversity of situation than others; and hence are exposed to considerable differences in various external agencies. "The wolf and the fox," says CUVIER,† "are found from the torrid zone to high northern latitudes; but, in this wide extent, the principal difference is a little more or less beauty in the fur. I have compared the crania of northern and Egyptian foxes with those of France, and have found only individual differences. Wild animals confined within narrow limits, particularly those of the carnivorous order, vary still less. A fuller mane is the only circumstance distinguishing the hyena of Persia from that of Morocco."

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* "I have carefully examined the figures of animals and birds engraven on the numerous obelisks brought from Egypt to ancient Rome. In the general character, which is all that can have been preserved, these representations perfectly resemble the originals, as we now see them. My learned colleague, Mr. GEOFFRY ST. HILAIRE, collected numerous mummies of animals from the sepulchres and temples of Upper and Lower Egypt. He brought away cats, ibises, birds of prey, dogs, monkeys, crocodiles, and an ox's head embalmed. There is no more difference between these relics and the animals we are now acquainted with, than between human mummies and the skeletons of the present day,—CUVIER, *Recherches sur les Ossemens Fossiles;* 1, *Disc. Prelim.* p. 80.

† CUVIER, *Recherches sur les Ossemens Fossiles;* i. *Disc. Prelim.* p. 75.

Variations in the quantity and quality of food may cause some slight differences: thus the tusks of elephants, or the horns of the deer kind, may be larger or longer where the aliment is more abundant and nutritious.

There are, however, many animals which are no longer in their natural wild state, having been domesticated or reduced to slavery by man. Here the original form is no longer strictly preserved; deviations take place in size, color, form, proportions, and qualities: and the degree of the effect will of course be measured by the intensity and duration of the cause.

The degree of domestication is very various. In some cases the animals do not breed in servitude; consequently each individual must be reduced from the original wild state: here no variation occurs. The elephant affords an example. The rein-deer is confined within narrow limits, as to temperature; and, since it cannot be removed from these, it varies little.

There are degrees of domestication dependent probably on original capabilities of education. The cat, which is only partially enslaved, merely varies in the texture and colour of its fur; and inconsiderably in size: but the skeleton of any tame cat differs from that of the wild in no essential point.

The greatest differences are produced when man regulates the sexual intercourse of animals: by selecting individuals to breed from, he can effect the most surprising changes in form and qualities; as the examples of the pig, sheep, horse, cow, and dog, will abundantly evince.. The deviation has become at last so great, that the original stock from which the animals descended is doubtful.

The herbivorous domestic animals, following us into all climates, and governed by us in their food, labor, and external defence or protection, exhibit variations which, although apparently very considerable, are chiefly superficial. The size, the greater or less developement or entire want of horns, the nature of the hairy covering, and such other points, are subjects of change. The skeleton, the form and connexions of the bones, the teeth, are never altered. The comparatively imperfect developement of the tusks in the pig, and the consolidation of the toes, are the most striking effects produced in this class of animals.

"The strongest marks of human influence are seen in the animals of which man has made the most complete conquest;—in the dog, who is so perfectly devoted to us, that he seems to have sacrificed to us his individual character, interest, and feelings. Carried by man all over the world, subjected to the action of the most powerful causes, and directed in sexual intercourse by the will of their master, the dogs vary in color; in the quantity of hair, which is sometimes entirely lost; in their nature and properties; in size, which may differ as one to five in linear dimensions, or more than one to a hundred in the mass; in the form of the ears, nose, tail; in the height of the limbs; in the developement of the brain, and consequent form of the head, which may be slender, with elongated muzzle and flat forehead,—or short, with convex forehead; so that the apparent difference between a mastiff and a spaniel, a greyhound and a poodle, are greater than we find between any wild species of the same natural genus. Lastly, which is the maximum of variation hitherto known in the animal kingdom, there are races of dogs with an additional toe and corresponding metatarsal bone on the hind foot, as there are six-fingered families in the human species. Still, in all these variations, the relations of the bones remain the same, and the form of the teeth is never altered."*

Thus we find that species must be taken in very different acceptations in wild and domestic animals:—that while all the beings included under the same species, exhibit, in the former case, a close and rigorous resemblance, admitting at most of slight diversities in color, fur, size, and developement of some less important parts; wider deviations are allowed in the latter, than are observed between some wild animals that are acknowledged to belong to different species.

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* Cuvier, *Recherches sur les Ossemens Fossiles;* 1, *Disc. Prelim.* p. 78.

It may be stated in the abstract, that all animals which differ in such points only as might arise in the natural course of degeneration, that is, from recognised causes of variation, belong to the same species; while those differences which cannot be accounted for on this supposition, must lead us to class the animals which exhibit them in different species. But the chief difficulty is, to point out the characters by which, in actual practice, mere varieties may be distinguished from genuine specific differences.

The transmission of specific forms by generation, and the aversion to unions with those of other kinds, soon led naturalists to seek for a criterion of species in breeding.* They established the rule, that those animals which copulate together, and produce an offspring equally prolific with themselves, belong to one and the same species, ascribing the differences which may exist between them to adventitious causes. The high authority of BUFFON and HUNTER, who adopted this opinion, occasioned the criterion of breeding to be very generally relied on.

If we admit this, the question respecting the human species would be immediately solved: for all the races breed together; and their offspring is prolific, either with each other, or with any of the original races. Indeed, we know no difference in productiveness between such unions and those of the same race.

This rule, however, involves a *petitio principii*, in assuming that animals of distinct species never produce together a prolific offspring. Generally, indeed, hybrid animals, or the offspring of any two species, are incapable of generation; and this is a powerful additional provision for preserving uniformity of species. There are, however, instances, both among the mammalia and birds, of individuals belonging to species universally held to be distinct, uniting and producing young, which were again prolific.

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* The principle has not escaped common observation: it is expressed in the English word breed, and in the German *gattung*, (species) which signifies copulation.

That the mule can engender with the mare, and that the she mule can conceive, was known to ARISTOTLE. The circumstance is said to occur most frequently in warm countries; but it has taken place in Scotland.[*] BUFFON states that the offspring of the he-goat and ewe possesses perfect powers of reproduction. We might expect these animals, with the addition also of the chamois, (antelope rupicapra) to copulate together easily, because they are nearly of the same size, very similar in internal structure, accustomed to artificial domestic life, and to the society of each other from birth upwards. There is a similar facility in some birds belonging to the genera fringilla, anas, and phasianus, where such unions are often fruitful, and produce prolific offspring. The cock and hen canary-birds produce with the hen and cock siskin and goldfinch;[†] the hen canary produces with the cock chaffinch, bullfinch, yellow-hammer, and sparrow. The progeny in all these cases is prolific, and breeds not only with both the species from which they spring, but likewise with each other.[‡] The common cock and the hen partridge, as well as the cock and the guinea-hen,[||] the pheasant and the hen,[§] can produce together.

The anser cygnoides (Chinese goose) copulates readily in Russia with the common goose, and produces a hybrid but perfectly prolific offspring: the race soon returns to the characters of the common goose, unless crossed again with the Chinese species.[¶]

It is true that these unnatural unions take place in animals under the power of man, are accomplished with the assistance of contrivance and stratagem, and generally require an attention to several preliminary circumstances: it is also found, that under artificial constraint and privation, unions of distinct species may take place without fecundation, as of the hare and bitch,[**] the bull and mare:[*] they prove, however, sufficiently, that this affair of generation will not afford the criterion we are in search of.

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[*] BUFFON, by WOOD; v. 4. p. 200, 205.

[†] Ibid. v. 14, p. 63, and following.

[‡] Ibid. p. 70.

[||] Ibid. v. 12, 61.

[§] PALLAS, *Spicil Zool.* f. xi. p. 36, note.

[¶] Ibid. *Act. Acad. Scient. Petrop.* 1780; p. 32, note. P. 96.

[**] PALLAS saw this in the instance of a tame hare kept with dogs. *Spic. Zool.* fasc. xi. p. 36, note.

It was soon found that this rule of reproduction could not be applied to domesticated animals, on account of their unnatural way of life; and hence FRISCH, towards the beginning of the last century, confined it entirely to the wild ones. And here it is of little service: for how can we ever expect to bring together those wild species to ascertain the point, particularly when they inhabit different countries; as, for instance, the chimpansé of Angola and the oran-utang of Borneo? Nor are there so many doubts about these, as about the domesticated animals, which are thus excluded.

The different breeds of dogs, for example, are referred by some to different species; and they are indeed sufficiently marked by distinctive permanent characters to warrant the opinion, if the constancy of such characters were a sufficient proof of difference in species. Others, again, refer them all to the shepherd's dog; and others include all the dogs, the wolf, fox, and jackall, in one species. The dog and bitch produce with the male and female wolf, and with the dog and bitch fox, and the offspring is prolific. Yet we cannot surely ascribe animals which are marked in their wild state by such strong characters, of bodily formation, disposition, and habits—as the wolf, fox, and jackall, to one and the same species, without overturning all the fundamental principles of zoology, however freely they may intermix, and however perfect the reproductive power may be in their offspring.[†]

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[*] BUFFON, v. 4, p. 221.

[†] PALLAS entertains the opinion that our sheep, dogs, and perhaps poultry, are factitious beings, not descended from any single wild original, but from a mixture of nearly-allied primitive species, whose hybrid offsprings have possessed prolific powers. He observes that those domesticated animals, which either do not intermix with other species, or which produce with other unprolific progeny, are very little changed, however completely and anciently they may have been brought under the dominion of man; or at least are not so changed as to cause any difficulty respecting their origin. This is the case with the horse and ass in all climates; with the ox kind; with the pig; the camel and dromedary: and the rein-deer. He refers our sheep to intermixtures of the Siberian argali (ovis ammon), the mouflon of Corsica and Sardinia.

We may conclude, then, from a general review of the preceding facts, that nature has provided, by the insurmountable barriers of instinctive aversion, of sterility in the hybrid offspring, and in the allotment of species to different parts of the earth, against any corruption or change of species in wild animals. We must therefore admit, for all the species which we know at present, as sufficiently distinct and constant, a distinct origin and common date. On the other hand, the fruitful intermixture which art has accomplished, of some of these species, will not justify us in ascribing to them identity of race or origin, when we see them in the natural wild state distinguished by constant characters from the type of the neighboring species, and always producing an offspring marked by these characters.

Since neither the principle of breeding, nor the constancy of particular characters, are sufficient in all cases to enable us to judge of species,—and since these fail, particularly in the domestic kinds, where their aid is principally required,—we must resort at last to the criterion recommended by **Blumenbach**, and draw our notions of species in zoology from analogy and probability. If we see two races of animals resembling each other in general, and differing only in certain respects, according with what we have observed in other instances, we refer them without hesitation to the same species, although the difference should be so considerable as to affect the whole external appearance. On the contrary, if the difference should be of a kind which has never arisen, within our experience of the animal kingdom, as a variety, we must pronounce them to belong to distinct species, even although there should be on the whole, a great general resemblance between the two. "I see," says this acute and judicious naturalist, "a remarkable difference between the Asiatic and African elephants, in the structure of the molar teeth. Whether these inhabitants of such distant regions will ever be brought to copulate

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that of Africa, (ovis tragelaphus, Cuv.), the wild goat of Persia, (paseng, the bezoar animal, capra ægagrus), the bouquetin (capra ibex), and the wild goat of Caucasus (capra Caucasica). The dog he considers to have proceeded from the jackall, wolf, and Fox.—*Mémoire sur la Variation des Animaux; Acta Petrop.* 1780.

together, and whether this formation be universal, is uncertain; but it exists in all the specimens I have seen or heard of; and I know no example of molar teeth changed in such a manner by degeneration, or the action of adventitious causes: therefore I conjecture from analogy, that these elephants are not mere varieties, but truly different species. On the other hand, I hold the ferret (mustela furo) to be only a variety of the pole-cat (m. putorius,) not so much because they produce together, but because it has red pupils: and the analogy of numerous other instances induces me to regard all the other mammalia, which are destitute of the coloring pigment of the eye, as varieties degenerated from their original stocks."*

This method is the only satisfactory one of investigating the varieties of the human species. The diversities of physical and moral endowment which characterize the various races of man, must be analogous in their nature, causes, and origin, to those which are observed in the rest of the animal creation, and must therefore be explained on the same principles.

There is no point of difference between the several races of mankind, which has not been found to arise, in at least an equal degree, among other animals, as a mere variety, from the usual causes of degeneration. Our instances are drawn chiefly from the domesticated kinds, which, by their association with man, lead an unnatural kind of life, are taken into new climates and situations, and exposed to various other circumstances, altogether different from their original destination. Hence they run into varieties of form, size, proportions, color, disposition, faculties; which, when they are established as permanent breeds, would be considered, by a person uninformed on these subjects, to be different species. Wild animals, on the contrary, remaining constantly in the state for which they were originally framed, retain permanently their first character.

Man cannot be called, in the ordinary sense of the term, a domesticated animal; yet he is eminently domestic. Inhabiting every climate and soil, acted on by the greatest variety of external agencies, using every kind of food, and following every mode of life, he must be exposed still more than any animal to the causes of degeneration.

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* *De Gen. Hum. Var. Nat.* p. 70, 71.

I proceed to consider the circumstances in which the several races of men differ from each other, to compare them to the corresponding differences of animals, and to show that the particular and general results of these inquiries lead us plainly to the conclusion, that the various races of human beings are only to be regarded as varieties of a single species. Whether this one species owes its origin to one pair, a male and a female, is a question which zoology does not possess the means of solving; a question which is of no more importance respecting our own species than it would be in the case of the elephant, lion, or any other animal.

CHAPTER II.

On the Color of the Human Species.—Structure of the Parts in which the Color resides—Enumeration of the various Tints.—Color and Denominations of the mixed Breeds.—Various Colors of Animals.—Production of Varieties.—Spotted Individuals.—Other Properties of the Skin.

Although a general survey of organized bodies, in both the animal and vegetable kingdom, by no means leads us to regard colour as one of their most important distinctions, but, on the contrary will soon convince us that it may undergo very signal changes, without essential alterations of their nature; and although this remark holds equally good of the human subject; yet the different tints and shades of the skin, offering themselves so immediately to observation, and forcing themselves, in a manner, on the attention of the most incurious, have always been regarded by the generality of mankind as the most characteristic attribute of the various races. These several hues form, indeed, very constant hereditary characters, clearly influenced by the colour of both parents in the mixed offspring of different varieties, and bearing close and nearly uniform relation to that of the hair and iris, as well as to the whole temperament of the individual.

The skin, in which the color of animals resides, is a more or less dense membrane, covering the surface, and generally proportioned in thickness to the volume of the body; serving the purpose of binding together and protecting the subjacent organs, of separating, under the form of sensible and insensible perspiration, a large quantity of excretory matter, the residue of digestion and nutrition, and of establishing the relations between the living frame and surrounding objects. It is the sensitive limit of the body, placed at the extremity of the organs, incessantly exposed to external influences, and thus forming one great connexion between animal existence and that of surrounding substances.

Anatomical analysis resolves this apparently single envelope of our organs, commonly called skin, into two or more strata, technically termed the common integuments.

The most considerable and important of these, making up, indeed, the chief bulk of the skin, is the cutis vera, or true skin, dermis, corium, le corion Fr.;—the part which, when prepared by the chemical process of tanning, constitutes leather. It is a compact and strong areolar tissue, composed of a dense and fibrous substance, with numerous vacuities or intervals. The intertexture of the fibrous or cellular tissue is close and compact on its external surface, so as to resemble the smooth continuity of a membrane; more loose, with larger areolæ on the opposite or adhering aspect, where the fibrous threads are lost in those of the subjacent cellular or adipous tissue. Immersion in water softens the skin, by separating the fibres of its corion, and rendering their intervals more distinct: we then find that the areolæ are not confined to the external surface, but are prolonged into its substance, which is penetrated by them in its whole thickness. They serve for the passage of hairs, exhalants, and absorbents, as they come to the surface.

The areolar tissue of the cutis is permeated in every direction by countless myriads of arterial and venous ramifications, of which the ultimate capillary divisions occupy the external or compact surface of the organ, and form a vascular network over the whole body, eluding our inquiries and defying calculation by the number and fineness of its tubes. In the glow of exercise or the flush of shame, in the excitement of fever, or the eruption of measles, scarlatina, &c. these cutaneous vessels are filled with blood; they may be injected with colored fluids after death. Their ramifications are particularly numerous and subtle in those parts of the cutaneous organ which possess the most exquisite sensibility; and where the surface is found, on minute examination, to be covered by numerous fine processes called papillæ or villi.*

The absorbents of the skin seem nearly equal in number to its blood-vessels.

Numerous nerves enter it in all parts, and distribute their largest ramifications in the situations occupied by the papillæ.

The color of the cutis is uniform, or very nearly so, in all the varieties of the human race, and depends entirely on the state of its capillary blood-vessels. According as they are full or empty, it may vary (as we see in the white races) from a more or less florid red, constituting what artists call flesh-color, to the waxy paleness of fainting or exhaustion from hæmorrhage. Maceration in water makes its areolar tissue quite white: and injection with size colored with vermilion gives it a deeper or lighter shade of red, according to the force employed.

The cuticle or epidermis, the exterior layer of our common integuments, is the thin transparent or light grayish pellicle raised by a blister: in the natural state it adheres closely, almost inseparably, to the subjacent parts, and is accurately fitted to the cutis, having folds and lines corresponding to all the inequalities of that organ. It presents no traces of fibres, laminæ, or cells; it has no blood-vessels, absorbents, or nerves. Therefore, though perforated by the hairs, by the excretory tubes of cutaneous follicles, by the exhalent mouths of the capillaries, and possibly by absorbent orifices, it is incapable of sensation and all vital actions, extravascular, inorganic. It is a protecting sheath for the finely-organized and sensible skin; and serves the further purpose of preventing evaporation, by which that organ would otherwise be inevitably dried. Thus the external surface of our living machine is in a manner dead; and objects applied to it act on the cuticular nerves through this insensible medium. When preternaturally thickened, it destroys sensation; if removed, as by blistering, the contact of bodies gives pain, but does not produce the appropriate impressions of touch.

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* The external vascular surface of the cutis, with its papillæ or villi, seems to be what BICHAT has described as a separate stratum, under the name of *corps reticulaire*. (*Anat. Générale.*) I have never seen the distinction. My object, here, is not, however, to describe the skin fully, but merely to consider it as the seat of color. They who wish for further information on the structure of the integuments, may consult Dr. REES's "Cyclopædia," art. INTEGUMENTS; and Dr. GORDON's "System of Human Anatomy," book ii. chap. 4.

The cuticle, as well as the cutis, is nearly the same in the white and dark-colored races: it is, on the whole, darker in the latter than in the former, and possesses a grayish or brownish tint. If there are any other slight modifications, they have not yet been ascertained.

A third and more delicate stratum, interposed between the epidermis and the true skin, and called the rete or reticulum Malpighii or mucosum, has been generally regarded as the seat of human color—of all the diversified tints which characterize the various races of men. The softness of its texture, and its perforation by hairs, papillæ, &c. account for the name *rete mucosum*.

It is a black layer, about as thick as the cuticle itself, or even thicker, in the Negro; and darker colored on its dermoid than on its cuticular surface. Putrefaction detaches it with the cuticle from the subjacent cutis; its further progress resolves the soft tissue into a kind of unctuous slimy matter, readily washed away from the cuticle and skin. It is not easily separated from the former: indeed it is, under all circumstances, very difficult,* and where the skin is delicate quite impossible, to exhibit it detached, in any considerable portion, as a distinct membrane. It agrees with the cuticle, in showing nothing like fibrous texture; in being inorganic and extravascular. It diffuses itself in water, and communicates a turbid cloud to the fluid like that produced by the pigmentum nigrum of the eye; then subsides, as an impalpable powder, to the bottom. Thus the source of color in the dark varieties of our species is satisfactorily ascertained.

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* SOEMMERING experienced this difficulty: he says, "It cannot, without much trouble, be shown as a peculiar detached membrane: and I could only succeed in the scrotum in exhibiting considerable portions of it as a separate, coherent, and independent membrane." "Ueber die Körperliche Verschiedenheit des Negers vom Europäer, p. 45, 46."

I have stated elswhere that "the demonstration of this reticular body is much less easy in the white races than in the Negro; and indeed very little seems to be known concerning its anatomy in the former;" and further, "that it seems really to be a matter of doubt, whether in the white races there be any coloring matter in the exterior capillary system analogous to the black substance of the Negro, or whether the color of their surface arise merely from that of the cutis and cuticle."* When the cuticle separates by putrefaction from the cutis, the surfaces are moistened by a putrid offensive fluid; but I could never detach any thing like a distinct membrane, even in the smallest portion.† The late Dr. GORDON came to a similar conclusion, from his investigation of the subject. "After the strictest examination, I have not been able to find any light-colored rete mucosum, corresponding to this black one, in the inhabitants of Great Britain, nor in those of other nations resembling them in color. I have tried all the means usually said to be necessary for discovering it, and many others besides, but always without success: I am, therefore, disposed to deny the existence of any such membrane in white persons"‡

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* REES'S "Cyclopædia," art. INTEGUMENTS.

† SOEMMERRING remarks that he *once* found, in an European female, the outer covering of the cutis distinctly divisible into two lamellæ; and that he preserves a specimen of it in his collection. "Ueber die Körperliche Verschiedenheit." &c. p. 45.

‡ "System of Human Anatomy;" v. 1. p. 242 I cannot omit this opportunity of paying to my deceased friend the small but sincere tribute of my high respect, and deep regret for the loss which our science has sustained in his premature death. His abilities, acquirements, and zealous devotion to science, were well known. At an early age he had distinguished himself as a teacher and a writer; and he set the useful example of appealing in all cases to nature, and admitting no statements which he had not personally verified. A brilliant and useful career was just opening before him: in the present state of anatomy in this kingdom, his labors and example would have been singularly useful.

The differences between black and white men in the texture of the rete mucosum are distinctly noted by **Blumenbach**. He states that the native reddish white of the cutis shines through the transparent outer coverings in the white races; while in the dark, the cutaneous pigment is seated in the rete mucosum; the epidermis, although pale, manifestly partaking of the tint. He adds, "Quo fuscius reticulum sit eo crassius quoque et propius ad membranulæ sui generis speciem accedens; quo pellucidius contra, eo tenerius et non nisi diffluì muci habitum præ se ferens."* **Haller**† uses a similar contrast; representing this part in the Negro as "involucrum, crassius quam in Europæis, et veræ membranæ simile, cum istis potius mucus sit coactus."

There is, in the Hunterian collection, a portion of white skin with the cuticle turned down: a small portion of a thin transparent pellicle has been subsequently separated from the cutis. A further examination, particularly in the skins of intermediate tints, will be required in order to settle the point. Although I cannot demonstrate rete mucosum in the European, I think that there must be under the cuticle some coloring matter: how can we otherwise account for the difference between the fair and the swarthy, or for the remarkable peculiarity of the Albino?‡

The colors impressed on the skin in the operation of tattooing, which we see so frequently in our sailors, and of which the South-

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* *De G. H. Var. Nat.* sect. iii. § 42.

† *Elem. Physiol.* lib. xii. sect. i. § 11.

‡ **Camper** seems to be influenced by similar arguments, rather than by direct anatomical evidence, in ascribing a rete mucosum to the white races. 'Credible esse mihi videtur, omnes homines reticulo simili gaudere, quod, pro, diversis regionibus, et in diversis hominibus non modo, sed in eodem, pro partium varietate, diversam superficiem nactum, album, fuscum, vel nigrum apparat. Præparavi cutis portionem, e latere fœminæ emortuæ deprompatam, cujus facies et pectus nive erant candidiora, in qua reticulum intense fuscum est." "Demonstrat. Anatom. Pathol." lib. 1. cap. 1.

He repeats in the same page, the common representation of the rete mucosum not being regenerated, and of cicatrices in blacks being therefore white. I have had repeated opportunities of ascertaining that this notion is altogether unfounded.

Sea Islanders exhibit such remarkable and often very elegant specimens, reside in the cutis, and are indelible, except by the removal or destruction of the part. The cuticle does not partake in the effect; which therefore, for obvious reasons, is brighter and more conspicuous when that integument has been removed.

When we direct our attention to the very numerous colors and shades which the several varieties of the great human family exhibit, merely with the view of ascertaining with how many external modifications nature has been pleased to diversify the chef d'œuvre of the terrestrial creation, the subject, like all belonging to man, has its attraction and interest. But the investigation becomes much more important, when it embraces the causes of these appearances, and the degree of force belonging to each; when we inquire whether the color of a people depends on the climate of their present or former abode, or on their descent; whether that of children is influenced by the climate in which they are born, or by the blood of their parents; whether it is a sure token of race and pedigree; how many principal or leading colors we ought to assign to man as at present known; and whether any and what number of these are to be deemed original or primary. These points are yet undecided, and certainly worthy of our attention.

The very nature of language, the want of adequate expressions to denote the endless shades of color, and the indeterminateness of those which are applied to various tints, create some difficulties in this part of the subject, by producing considerable discrepancies in the reports of travellers, which again are of course increased in many cases by haste and carelessness; by superficial examination, and loose choice of expressions. The same tribe will be very differently described according to the comparison which the observer makes between them and any model in his mind; or according to the contrast they may present with the lighter, darker, or differently colored people, whom he may have recently observed.

The human skin is dyed with various tints of white, yellow, red, brown, black; and it exhibits, in degree, every possible intermediate shade between the clear snowy whiteness of the most delicate European female, or of the Albino, and the deep ebony or jet black of a Gold-coast Negress. None of these gradations obtains so universally as to be found in all the individuals of any particular nation, nor is so peculiar to any one people, as not to occur occasionally in other widely different ones: we may, however, refer the national varieties of color, on the whole, with sufficient accuracy, to the five following principal classes:—

I. *White*, to which redness of the cheeks is almost wholly confined,* being observed, at all events, very rarely in the other varieties. It is seen in all the European nations, excepting the Laplanders; in the western Asiatics, as the Turks, Georgians, Circassians, Mingrelians, Armenians, Persians, &c.; and in the northern Africans.

" It is only," says **Humboldt**, " in white men, that the instantaneous penetration of the dermoidal system by the blood can take place,—that slight change of the color of the skin, which adds so powerful an expression to the emotions of the soul. ' How can those be trusted, who know not how to blush ?' says the European, in his inveterate hatred to the Negro and the Indian."†

Yet in some very light examples of the brown and yellow varieties, blushing has been noticed; as by **Forster**,‡ in the fairest

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* Capt. Cook observes of the Otaheiteans, that " their natural complexion is that kind of clear olive or brunette, which many people in Europe prefer to the finest white and red. In those who are exposed to the wind and sun, it is considerably deepened; but in others, that live under shelter, especially in the superior class of women, it continues of its native hue, and the skin is most delicately smooth and soft. They have no tint in the cheeks, which we distinguish by the name of color." **Hawkesworth**'s *Voyages*, v. ii. p. 187.

In the mountaineers of Bootan, which he saw on the road from Tassisudon to Teshoo-Loomboo, and who seem to possess all the traits of the Mongolian race, Capt, **Turner** particularly noticed the ruddiness of their countenances. *Embassy to the Court of the Teshoo Lama*, p. 193.

† *Personal Narrative*, v. iii. p. 229.

Mr. **Chappell** says of the Eskimaux, that " the complexion is a dusky yellow but some of the young women have a little color bursting through this dark tint." *Narrative of a Voyage to Hudson's Bay*, p. 58.

‡ *Observations made on a Voyage round the World*, p. 229. He says that the complexion of the chiefs, or best-formed race in Otaheite, " is of a white

Otaheitean women; and by Dampier,* in the Tunquinese; "They are," he observes, "of a tawny Indian color; but, I think the fairest and clearest I ever saw of that complexion: for you may perceive a blush or change of color in some of their faces on any sudden surprise of passion, which I could never discern in any other Indians."

Considerable variety, however, will be found to exist in the color known by the general epithet *white*.

That singular description of human beings, called Albinos, possess a skin of a peculiar reddish, or an unnatural white tint, with corresponding yellowish white or milk white hair, and red or at least very light blue or grey eyes. The cutaneous organ has sometimes a roughness, which has been construed to approach to a degree of lepra.† The hair of all parts of the body is unnatur-

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tinctured with a brownish yellow, however not so strongly mixed, but that on the cheek of the fairest of the women you may easily distinguish a spreading blush."

* *Voyages*, v. ii. p. 40.

† Blumenbach has given an interesting description of two brothers who live in the Vale of Chamouny. "Cutis eorum, præter ruborem singularem, maximo in facie conspicuum, præprimis epidermide in niveos et tenellos furfures quasi fatiscente, memorabilis erat. Capilli autem lanæ caprinæ similes, tum recto et omnis inflexus experto decursu, tum insueto colore ex albo singulariter flavescente, erant insignes. Quibus etiam cilia, et supercilia, et pubes tenella, cum mentum tum reliquum corpus obsidens, respondebant." *De Oculis Leucæthiopum, et Iridis Motu*, in *Commentation*, *Reg. Soc. Scient. Goetting*. v. 7.

Dr. Winterbottom saw a white African woman with a remarkably coarse and wrinkled skin; it was dry and harsh to the touch, and marked with deep furrows. It had a reddish tinge in parts exposed to the sun, being of a dirty white in other situations. Black spots, like freckles, of the size of a pea, were thickly scattered over the skin. Another tall and well-formed white Negress had the skin of an unpleasant dead-looking white, and pretty smooth, but beginning to assume a cracked appearance from the action of the sun. *Account of the Native Africans*, v. ii. p. 167—170.

In five or six seen by Cook, at Otaheite, the skin was of a dead white, like the nose of a white horse, scurfy, and covered with a white down: they had white hair, beard, eyebrows, and eyelashes. Hawkesworth, *Voyages*: v. ii. p. 183.

ally white and soft; it has not the snowy whiteness of old age, nor the elegant light yellow or flaxen appearance of the fair-haired (*blondins* Fr.) German variety; but it is compared to that of milk or cream, or of a white horse. The eyebrows, eyelashes, beard, the hair of other parts, and often a soft down covering the whole body, are of the same color. The iris is of a pale rose color, and the pupil intensely red:* these parts, in short, are exactly similar to the corresponding ones in white rabbits and ferrets.†

The characters of the Albino arise from a deficiency of the coloring principle, common to the skin, hair, and eyes. Thus the former has the hue, which its cellular and vascular contexture produces; the hair is reduced to its simple organic groundwork; and in the eyes, which are entirely destitute of pigmentum, the color of the iris depends on the fine vessels which are so numerous in its composition, and that of the pupil on the still greater number of capillaries which almost entirely form the choroid membrane.

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* "Oculi in universum cuniculorum alborum oculis perfecte similes: iride nempe tenella et fere pollucidula, valde mobili, quasi oscillante, et quæ jam sub modica luce late expandebatur; colore diluto, inter pallide violaceum et rubellum medio. Pupillis autem saturate rubicundis et fere rutilis, qualis succi rubi idæi intensior esse solet." Blumenbach in *lib. cit.*

† Two African Albinos were brought to France, and seen by Voltaire, who has selected and shortly characterized their leading traits: "Leur blancheur n'est pas la nôtre; rien d'incarnat, nul mélange de blanc et de brun, c'est une couleur de linge, ou plutôt de cire blanchie; leurs cheveux, leurs sourcils sont de la plus belle et de la plus douce soie; leurs yeux ne ressemblent en rien à ceux des autres hommes, mais ils approchent beaucoup des yeux de perdrix." *Essai sur les Mœurs*, Introduction. They are also described by Buffon, *Supplement*. t. 4. p. 559.

Pallas has minutely described a "Leucæthiopissa elegantissima," whom he saw in London in 1761. "Sedecim tunc circiter annos nata, et a patre atque matre nigritis in Jamaica insula genita dicebatur, de quo tanto minus dubitari poterat, quum nihil hybridæ ex albo nigroque parente geniture simile præ se ferret. Staturæ erat minoris, artubus et collo turgidulis, cute sanguineo-phlegmaticæ tincturæ candida, labiis rubris et rubicundis genis vigens, vultu omnino Æthiopis, naso quassato, labiis tumidis, fronte brevi, circumscriptione faciei subrotunda, notis variolarum sparsis cutem minus teneram distingurntibus. Oculorum irides neque rubri nec cæsii, sed griseo-lutensentis eraat coloris;

The close connection of these parts, in respect to their color, is evidenced by the fact that neither is ever separately affected.

The state of the eyes is the principal source of inconvenience. The absence of the black pigment, which has the important office of absorbing superfluous portions of light, renders the eye preternaturally sensible of this stimulus. Strong lights affect the organ painfully: even the glare of open day is too much. Hence the eyelids are more or less closed; the eyes are described as weak and tender, and sometimes as affected with chronic lippitudo. These evils are balanced, in some measure, by superior power of vision in twilight, dusk, or imperfect darkness. "Ad nocturnam quidem caliginem, non magis quidquam discernere poterant ac alii homines. In crepusculo autem, et ad lunæ debiliorem lucem, longe acutius ac vulgo possumus videbant. Fulgida vero lux, sive meridiana sereno cœlo, sive candelarum aliusve ignis, non quidem per se valde molestus ipsis videbatur, verum plane inutilis: cum quidem eandem sine graviore incommodo aut dolore perferre possent, non aliter autem exinde occæcarentur, ac nos ubi solis fulgore aut nivis candore subito perstringimur."*

Mr. JEFFERSON had seen seven examples of this peculiarity in the Negro race. Three of them were sisters; having two other full sisters who were black. Two of them bore black children to black men. They were uncommonly shrewd, quick in their apprehension and reply. Their eyes were in a perpetual tremulous vibration, very weak, and much affected by the sun; but they could see better than other persons in the night. The fourth is a woman, whose parents came from Guinea, and had three other children of their own color. She is freckled; and has such weak

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neque visus nocturnus, sed tamen apertæ lucis intolerantia, quam præsertim post variolas ortam narrabant custodes. Cilia et supercilia pallide flava, et capillitium totum ejusdem quidem coloris (blond) pallide flavi, at penitus in densissimos circinnos crispatum, et duriusculam Æthiopis lanam ad amussim referens. Hebeti videbatur ingenio, et pudibunda spectatores admittebat: sanissima cæteroquin et egregia corporis proportione. Cognatos omnes nigerrimos Æthiopes habuisse dicebatur." *Novæ Species Quadrupedum*, pp. 10—11 Note a.

* BLUMENBACH in *lib. cit.*

eyes, that she is obliged to wear a shade in the summer; but she sees better in the night. She bore an Albino child to a black man. Another white Negress had a black daughter by a black man. The last instance was male, tall, with tremulous weak eyes.*

WAFER has given a good description of those which are met with in the isthmus of Darien. Their skin is milk-white, much like the color of a white horse, and covered with a short down. "They see not very well in the sun, poring in the clearest day, their eyes being but weak, and running with water if the sun shine towards them: so that in the day-time they care not to go abroad, unless it be a cloudy dark day. But notwithstanding their being thus sluggish and dull in the daytime, yet when moon-shiny nights come, they are all life and activity, running abroad and into the woods, skipping about like wild bucks; and running as fast by moonlight, even in the gloom and shade of the woods, as the other Indians by day, being as nimble as they, though not so strong and lusty." Hence they are called moon-eyed.†

The peculiarity always exists from birth: it never changes afterwards; and it is propagated by generation.

In the natural history of our species the Albinos have not met with much better treatment than the Negroes; for some have doubted whether they, as well as the latter, belong to the same species with us.‡ The Negroes were too black, the Albinos too white. They have been supposed incapable of propagation. They are, in truth, not numerous enough for them to breed together, and thus form a permanent variety; but, that they can both beget and conceive, is most abundantly proved. I know no instance of two being matched together; but when they are paired with common Negroes, the offspring is generally black, sometimes white.

Of a white African woman, the parents, brothers, and sisters were all black. She was married to a black man, and had a black child. A white Negro with dirty white woolly hair, reddish brown eyes, and very weak sight, was the son of a white Negro. His mother, three brothers, and two sisters, were black: one sister was white like himself.[*]

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* *Notes on Virginia*, p. 112—120.

† *New voyage and Description of the Isthmus of America*, p. 134. & seq.

‡ VOLTAIRE *Essai sur les Mœurs*; introduction: also chap. 143.

A classical writer[†] on the natural history of man has conceived that they labor under a disease, which he refers to the cachexiæ, and considers as akin to leprosy; and this opinion has had so much weight with Dr. Winterbottom, that he never mentions the Albinos in his first volume, which contains a description of the native Africans; but thrusts them into the second, among the diseases.

I consider these views completely incorrect. The individuals in question do not exhibit a single character of disease. All their functions are executed as in other persons. They are born of healthy parents, occur among the robust and hardy members of savage tribes, and a similar deviation takes place in many wild animals. Mr. Jefferson expressly mentions, of the seven cases which he saw in American Creole Negroes, that all the individuals were well formed, strong, and healthy.

The first example mentioned by Dr. Winterbottom,[‡] is the daughter of two Mulattoes, born in Nova Scotia, who had all the Negro features, with woolly hair of a dirty white color, and a skin equalling in whiteness that of an European, without any thing disagreeable in its appearance or texture. Her eyes were between a red and light hazel color, and not much affected by light. There are no signs here of cachexia or leprosy: nor are there any in the two Swiss youths described by Blumenbach, and before him by Saussure.[‖] They seem, indeed, to be short for their age; the elder was twenty-two years old, with the stature of fifteen: the younger seventeen, with that of twelve. Two writers of very different characters, who had both seen African Albinos, seem to have equally felt that the notion of disease was quite unfounded; and have used the very same words in conveying thir strong opinion to this affect: "Prétendre que ce sont des Négres nains, dont une espece de lèpre a blanchi la peau, c'est comme si l'on disoit que les noirs eux-mêmes sont des blancs que la lèpre a noircis."[*] "Cæterum," says PALLAS, "hasce varietates Æthiopum albas non magis morbosam naturam (quod BLUMENBACHIO placuit) appellari posse puto, quam ipsa Æthiopum nigredo morbus est."[†]

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[*] Winterbottom in *lib. cit.*

[†] Blumenbach *de G. H. Var. Nat.* sect. iii. § 77. He terms it "Varietas gentilitia ex morbosa affectione."

[‡] Lib. cit. II. 116.

[‖] *Voyages dans les Alpes*, IV. 303.

This variety was first observed in the African, as the great difference of color renders the variation more striking: hence the individuals were termed Leucæthiopes,[‡] or white Negroes: their peculiar constitution—for the deviation is by no means confined to the surface of the body—may be conveniently termed, after some modern authors, leucæthiopia. From their avoiding the light, the Dutch gave them (in the island of Java) the contemptuous appellation of Kakkerlakken, cockroaches, insects that run about in the dark; and hence the French name Chacrelas. The Spaniards called them Albinos, and the French Blafards.

So far is this variety from being peculiar to the Negro, or even to the torrid zone, that there is no race of men, nor any part of the globe, in which it may not occur. BLUMENBACH[||] has seen sixteen examples of it in various parts of Germany; and it has been also noticed in Denmark, England,[§] Ireland, France, Switzerland, Italy,[¶] the Grecian Archipelago, and Hungary.

It is probably more common in Africa than elsewhere: Dr. WINTERBOTTOM mentions eleven instances among the native tribes about Sierra Leone: and Mr. JEFFERSON seven among the

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[*] VOLTAIRE *Essai sur les Mœurs*, introduction.

[†] *Novæ Species Quadrupedum*. p. 11, note.

[‡] PLINY mentions Leucæthiopes in his *Natural History*, lib. V. sec. 8.; and *Ptolemy*, l. 4. c. 6. But whether they mean Albinos, is doubtful.

[||] *De G. H. Var. Nat.* p. 278. *Medicinishe Bibliothek*. t. 3. p. 161. et seq.

[§] An English Albino is shortly mentioned by Mr. HUNTER; *Obs. on certain Parts of the animal Economy*, p. 207.

[¶] BUZZI had the opportunity of dissecting one at Milan. I have not succeeded in procuring his *Dissertazione sopra uno Varieta particolare d'Uomini bianchi Eliofobi*, 4to. Milano, 1784.

Negro slaves of America. The African Albinos do not present that entire absence of coloring matter from the eye, which we observe in the European instances. Mr. JEFFERSON does not mention the colors of the eyes; but Dr. WINTERBOTTOM describes them as light blue or brown. They were as weak as the red eyes of our Albinos.

Mr. BOWDICH informed me that the King of Ashantee has collected nearly a hundred white Negroes.

HUMBOLDT[*] says that examples of this degeneration are rare in the copper-colored race. Yet they seem rather numerous, by WAFER's description, in the isthmus of Darien. In the gardens of a palace belonging to Montezuma, were found, at the time of the Spanish conquest, among rare birds, and other curiosities, "Albinesi d'ogni età et d'ogni sesso.[†]

DUBOIS states that they are not uncommon among the Hindoos.[‡]

COOK met with them in several islands of the Pacific.[||]

In all cases, however, this leucæthiopic constitution has only occurred sporadically, or in detached instances, as a congenital variety, from individuals of the ordinary characters in their respective races. It has indeed been asserted that whole tribes of Albinos exist in Africa,[§] Java, Ceylon, and the isthmus of Darien;[¶] but no eye-witness reports such a fact; and WAFER,[**] whose authority is often cited, expressly mentions, "that they are not a distinct race by themselves, but now and then one is bred of a copper-colored father and mother." Hence the notion of entire leucæthiopic nations may be regarded as completely unfounded.

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[*] *Personal Narrative*, iii. 288.

[†] CARLI *Letere Americane*; t. i. let. 5.

[‡] *On the Character, Manners, &c. of the People of India*: p. 190.

[||] At Otaheite: HAWKESWORTH's *Collection*, ii. 99: 188: at the Society Isles, and New Caledonia; *Voy. towards the S. Pole*, ii, 114. at Hapace and Annamooko (Friendly Isles;) *Voy. to the Pacific*. i. 381.

[§] "Les Albinos sont à la vérité une nation tres petite et tres rare; ils habitent au milieu de l'Afrique, leur faiblesse ne leur permet guère de s'écarter des cavernes ou ils demeurent; cependant les Negres en attrapent quelquefois, et nous les achetons d'eux par curiosité." VOLTAIRE *Essai sur les Mœurs*, introduction.

[¶] BUFFON by WOOD; vol. iii. pp. 328, 344, 419.

[**] *Loc. cit.*

There is another description of men with a very fair or white skin, yellow (flaxen) or red hair, and generally blue or light gray eyes (irides.) Such individuals, when the health is good, and the circulation active, have a rosy tint, which is deeper and more florid in the face. The cutaneous capillaries are easily filled; and their "eloquent blood" sympathizes with every mental emotion. The ancient and modern Germans,and the nations descended from them, the Belgians, Dutch, the Danes, Swedes, English, &c. have this character.

Lastly, there is a most extensive race, including nearly all the people enumerated in the first division, with the skin, although white, possessing more or less of a brown tint, accompanied with dark brown or black hair, and dark eyes.

II. *Yellow or olive* (gilvus or buxeus, a middle tint, between that of ripe wheat and boiled quince or dried lemon-peel) characterizes the Mongolian tribes, usually called, together with the inhabitants of great part of Asia, Tartars (Tartars.)

III. *Red or copper color (bronzé* Fr. an obscure orange or rusty iron color, not unlike the bark of the cinnamon-tree) prevails in various shades over nearly the whole continent of America, and is almost confined to that division of the globe.

IV. *Brown or tawny (basané* Fr. a middle tint between the color of fresh mahogany and of cloves or chesnuts.) It characterizes the Malays, and most of the inhabitants of the numerous islands scattered through the Pacific Ocean.

V. *Black*, in various shades, from the sooty color or tawny black, to that of pitch or ebony, or jet-black. This prevails very extensively on the continent of Africa, characterizing all the Negro tribes. It is found also in the Negro-like natives of New Holland, Van Diemen's Land, Papua or New Guniea, the New Hebrides, and other islands of the South Sea; and is seen, mingled with the national color, in Brazil, California, and India. The New Caledonians constitute an insensible transition, with the chesnut-colored islanders of Tongataboo, and the dark New Hollanders, from the tawny or brown Otaheiteans to the Papuas or Negroes of New Guinea.

In describing these varieties, it is necessary to fix on the most strongly-marked tints, between which there is every conceivable intermediate shade of color. The opposite extremes run into each other by the nicest and most delicate gradations; and it is the same in every other particular, in which the various tribes of the human species differ. This forms no slight objection to the hypothesis of distinct species: for, on that supposition, we cannot define their number, nor draw out the boundaries that divide them: whereas, in animals most resembling each other, the different species are preserved pure and unmixed. Neither does the color, which I have described in general terms as belonging to any particular race, prevail so universally in all the individuals of that race as to constitute an invariable character, as we should expect if it arose from a cause so uniform as an original specific difference; its varieties, on the contrary, point out the action of other circumstances. Thus, although the red color is very prevalent on the American continent, travellers have observed fair tribes in several parts; as, Ulloa* and Bouguer† in Peru; Cook‡ and Vancouver|| at Nootka Sound; Humboldt§ near the sources of the Orinoco; and Weld near the United States. The natives of New Zealand vary from a deepish black to an olive or yellowish tinge¶. In the Friendly Islands many of the women are as fair as those of Spain or Portugal; several of both sexes are of an olive color: and many of a deep brown.**

The domestic animals exhibit varieties entirely analogous to those which have just been enumerated: a fact so familiarly known with respect to the sheep, pig, horse, cow, dog, cat, rabbit,

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* *Voyage to South America*; i. 257.

† *Relation abrégée du Voyage, &c.*: in *Acad. des Sciences*, 1740, p. 274. He represents the Peruvians at the foot of the Cordilleras to be nearly as white as Europeans.

‡ He represents the color of their skin as not very different from that of Europeans, but with a pale dull cast. *Voy. to the Pacific*; ii. 303

|| *Voyage*: i 395

§ *Political Essay on the Kingdom of New Spain*: i. 111

¶ Anderson, in Cook's *Voyages to the Pacific*: i 151

** Cook's *Voyages to the Pacific*; i 381

&c. that it cannot be necessary to support the assertion by any details. The leucæthiopic constitution occurs too in wild and domesticated animals, as well as in the human subject. It has been observed (not to mention the well-known examples of the rabbit, ferret, mouse, horse) in the monkey, squirrel, rat, hamster, guinea-pig, mole, opossum, martin, weasel, roe,[*] fox,[†] rhinoceros,[‡] elephant,[||] badger, beaver,[§] bear, camel,[¶] buffalo,[**] and ass.[††] The crow, blackbird, canary-bird, partridge, common fowl, and peacocks, are sometimes the subjects of it; but it has never been seen in any cold-blooded animal.

In the leucæthiopic mammalia, and birds just enumerated, the nature and characters of the deviation seem to be perfectly analogous to those of the human Albino. The pure whiteness of their skin and other integuments, and the redness of the iris and pupil, mark the same deficiency of coloring matter. A white mouse possessed by **BLUMENBACH** also exhibited the intolerance of light, which has been noticed almost universally in the human examples, the animal kept its eyelids closed even in the twilight.[‡‡]

When two varieties copulate together, the offspring resembles neither parent wholly, but partakes of the form and other properties of both. This cannot with propriety be termed *hybrid* generation, as authors apply that word to the animals produced by the copulation of different species; as, of the horse and ass, the canary-bird and goldfinch. In this sense, hybrids are never produced in the human species. "Non desunt," says BLUMENBACH, "historiæ nefandæ hominum cum brutis copulæ, quando aut viri cum bestiarum femellis rem habuerunt, sive effrenata libidine rapti,[*] sive ex vesana continentiæ opinione,[†] sive quod medicum usum ex ejusmodi facinore sperarent;[‡] aut feminas a brutorum masculis[||] subactas esse relatum est, sive violenti stupro id acciderit, sive sollicitantibus ex libidine insanientibus feminis,[§] sive prostituentibus sese ex religiosa superstitione;[¶] nullum tamen unquam a teste fide digno relatum comperimus exemplum, ubi fecunda evaserit ejusmodi copula, hybridumque ex hominis cum

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[*] BLUMENBACH *de G. H. Var. Nat.* sect. iii. § 78.

[†] SHAW's *Zoology*.

[‡] BARROW's *Travels in South Africa;* i. 395.

[||] "The white elephants are very rare, and highly valued; they receive the greatest care and attention, and are regarded in some cases with a kind of religious respect. One of his Birman majesty's titles is, 'Lord of the white elephant.'" SYMES' *Embassy to Ava;* 8vo. v. 2. p. 390; and v. 3. p. 338.

[§] The beaver may deviate either into white or black. The white are very scarce; the black are beautifully glossy, and more common. HEARNE's *Journey to the Northern Ocean*, p. 241.

[¶] "One of the camels was pure white, with blue eyes." ELPHINSTONE's *Account of Caubul, Introduction*, p. 30.

PALLAS mentions the same fact. *Travels in the Southern Provinces of the Russian Empire.*

[**] SHAW's *Zoology*.

[††] BUCHANAN's *Journey from Madras, &c.* v. 1, p. 7.

[‡‡] *Commentation Reg. Soc. Scient. Götting.* v. 7, p. 34.

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[*] TH. WARTON ad THEOCRITI *Idyll*. i. 88. p. 19. "Audivi ex docto quodam amico, qui per Siciliam insulam iter faciens, ibidem cum vetera monumenta, tum populi mores accuratius investigaverat, inter confessionis articulos a Siculis caprariis apud montes vitam solitariam degentibus, etiamnum per sacerdotes proprios rite solere exigi, an rem cum hircis suis habuerint!"

[†] MART, a BAUMGARTEN, *Peregrinatio in Egyptum, Arabiam*, &c. p. 73. "Ex Alchanica Egypti egressi, venimus ad casale quoddam Belbes dictum, ubi carabenæ eunti Damascum sumus conjuncti. Ibi vidimus sanctum unum Saracenicum, inter arenarum cumulos, ita ut ex utero matris prodiit, nudum sedentem. Audivimus sanctum illum, quem eo loco vidimus, publicitus apprime commendari: eum esse hominem sanctum, divinum ac integritate præcipuum, eo quod nec fœminarum unquam esset nec puerorum, sed tantummodo asellarum concubitor atque mularum."

[‡] Hoc fine Peras ischiade laborantes onagras inire PALLAS auctor est, in *Neuen Nordischen Beyträgen*, p. ii. pag. 38.

[||] PHILLIPS, speaking of the baboons of Guinea in CHURCHILL'S *Collection of Voyages*, v. 6. p. 211, says, "Here are a vast number of overgrown large baboons, some as big as a large mastiff dog, which go in droves of fifty and one hundred together, and are very dangerous to be met with, especially by women; whom I have been credibly informed they have often seized upon, ravished, and in that kind abused, one after another, till they have killed them.

[§] Ita feminas Kamtschadalicas quondam cum canibus coivisse STELLER refert, in *Beschreibung von Kamtschatka*, p. 289.

[¶] Ut Mendesiæ feminæ cum hirco sacro: de quo singulari ritu videsis uberrime disserentem D'HANCARVILLE in *Recherches sur l'Origine des Arts de la Grèce*, t. 1, p. 320.

bestia immani coitu prognatum fuerit." Yet the laws of various countries have directed that the fruit of such unnatural intercourse should be burned, or otherwise destroyed.

We can only speak, in the human subject, of such hybrids as proceed from copulation of the different varieties of one and the same species, as of a cart-horse and a racer, the green and white canary-birds, &c. These unions have a great effect in changing the color, conformation, and other properties of the offspring, and are consequently employed with wonderful advantage in improving the breeds of our domestic animals, particularly the horse, sheep, and cattle.

Children produced from the copulation of different races exhibit the middle (or nearly so) between the two tints of their parents. This law holds good universally; climate not making the smallest difference: Mulattoes precisely similar are produced from the union of Negroes and Europeans, whether in Africa, in the East Indies, in the sugar islands, in North America, or in Europe. From a refinement of vanity, the inhabitants of the Spanish colonies in America have enriched their language with terms for the finest shades, which result from the degeneration of the primitive color; and have also distinguished the offspring of the various dark-colored races with the whites.

In the first generation, the offspring of Europeans and Negroes are called Mulattoes (*mulâtre*, Fr.) The word Creole *(criollo)* has been frequently confounded with this, even by good writers; but that name, originally applied by the first Negroes conveyed to America in the sixteenth century, to their children born in that country, and borrowed by the Spaniards from them to denote their own offspring in the New World,* belongs properly to the children of European or Negro parents born in the East or West Indies.

In color, figure, and moral qualities, the Mulatto is a medium between the European and African. The color is more or less yellow, brown, or tawny, according as the European father may have been fair or dark; and the countenance has the middle form between that of both parents.* There is no redness of the cheek. The hair is curled and black, but much longer than that of the Negro; and the iris is dark. In cleanliness, capacity, activity, and courage, they are decidedly superior to the Negroes.

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* GARCILOSSO *del Origen de los Incas*, p. 255. We can easily understand how the use of the word may have been extended in the West Indies to the animals which have been produced from stocks imported from the Old World.

Europeans and Mulattoes produce Tercerons (sometimes also called Quarterons, Moriscos, and Mestizos.) The hair and countenance of these resemble the European: the former has nothing of the grandmother's woolly curl: the skin has a light brown tint, and the cheeks are red. In the Dutch colonies they often have blue eyes and fair hair. The stain of the black blood is principally visible in the organs of generation: the scrotum is blackish in the male, and the labia pudendi dark or purplish in the female.

In political rights these class with the mulattoes in the European colonies.

Europeans and Tercerons produce Quarterons or Quadroons (ochavones, octavones, or alvinos,) which are not to be distinguished from whites; but they are not entitled, in Jamaica at least, to the same legal privileges as the European or white Creoles, because there is still a contamination of dark blood, although no longer visible. It is said to betray itself sometimes in a relic of the peculiar strong smell of the great-grandmother.

The genealogy of these hybrid races is carried into the fifth generation, the children of Europeans and Quarterons being called Quinterons† (*puchuelas* Span.) It is not credible that any trace of mixed origin can remain in this case, according to the observations of the most judicious eye-witnesses concerning the third generation, viz. that in color and habit of body they cannot be distinguished from their European progenitors. Accordingly, even the law is now satisfied, and considers them sufficiently whitened to enjoy its full protection: they are legally white and free.

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* Whether either color or sex affects the offspring more strongly than the other, is an interesting question, which we have not the means of answering satisfactorily. I find an opinion expressed, that in the union of the European and Negress, the nobler blood predominates. Estwick, *History of Jamaica*; ii 335. There is the same authority for an opinion that male and female Mulattoes do not produce so many children together, as if they were united respectively to Negresses and Europeans. Mr. Long, in his *History of Jamaica*, gives a similar testimony on this point, and that in strong terms.

† The offspring of a Quadroon woman and white man is called Mestize, or

By an opposite course of proceeding, the mulatto offspring of the European and Negro may be reduced again to the characters of the latter. If the Mulatto be paired with a Negro, and the children again and again with Negroes, the fourth generation is perfectly black.

Thus, in obedience to that principle by which the properties of the offspring depend on those of the parents, we have the power of changing one species into another by repeated intermixture. If the offspring of a white woman and a black be matched with a black man, and this process be repeated two or three times, the form of the original mother is entirely lost, and that of the father substituted: or, vice versa. In this manner the color of the race may be completely changed in three or four generations; while it never has been changed by climate, even in the longest series of ages.

The offspring of an European and Indian (American) is named Mestizo* (*mestee*, Eng.) The hair is black and straight; the iris dark: the skin varies according to the tint of the American parent. As the latter is by no means so dark-colored as the Negro, the Mestizo is much lighter than the Mulatto. Many native Americans are nearly as fair as Europeans: hence Mestizos are often not distinguishable by color from Europeans.

"A Mestizo," says HUMBOLDT,† "is in color almost a pure

Mustee, according to EDWARDS, *Hist. of the West-Indies*; ii. 18: and WINTERBOTTOM, *Account of the Native Africans*; i. 188.

* They are also sometimes called Mestindi, Metifi, Mamelucki.

† *Political Essay*, v. 1, p. 244. The testimony of ULLOA is to the same effect. "The inhabitants (of Conception) consist of Spaniards and of Mestizos, who in color are hardly distinguished from the former; both being very fair and some have even fresh complexions." *Voyage to South America*; ii. 237.

white, and his skin is of a particular transparency. The small beard, and small hands and feet, and a certain obliquity of the eyes, are more frequent indications of the mixture of Indian blood, than the nature of the hair."

They have often some parts of the body darker than others; and this is always the case with the organs of generation in both sexes. European fathers and Mestee mothers produce Quarterons, Quatralvi, or Castizos, corresponding to Tercerons in the Negro breed; and not distinguishable from Europeans;* Quarteron women with Europeans, Ochavons, or Octavons; and Europeans with female Octavons, Puchuelos, which are not only not distinguishable in any respect from native Europeans, but also enjoy full legal rights and privileges in the Spanish colonies.

The offspring of Negroes and Americans are called Zambos or Sambos;† and sometimes Mulattoes. Negroes with Mulattoes produce Zambos‡ de Mulata (griffos, or cabros); an European and Zambo, a Mulatto; an American and Zambo, a Zambiago. The offspring of the Zambos are styled, in derision, by the Spaniards, Cholos; that of a Negro and Zamba is called Zambo prieto (black Zambo.)‖

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* If a Mestiza marry a white man, the second generation differs hardly in any thing from the European race." Humboldt, *loc. cit.*

† "The descendants of Negroes and Indian women bear at Mexico, Lima, and even at the Havannah, the strange name of Chino, Chinese. On the coast of Caraccas, and, as appears from the laws, even in New Spain they are called Zambos. This last denomination is now principally limited to the descendants of a Negro and a female Mulatto, or a Negro and a Chinese female." Humboldt, *loc. cit.*

‡ The offspring of a Negro or Negress with a Mulatto man or woman, is called, in the English colonies, Sambo. Edwards' *History of the West-Indies;* v. 2. p. 18.

‖ If a Mulatto and Terceron, or Terceron and Quarteron, intermix, the offspring are called 'Tenti en ayre,' by the Spaniards; because they remain in the same legal condition, neither advancing nor receding. Ulloa, *Voyage*, i. 30.

If a Terceron mixes with a Mulatto woman, or a Quarteron with a Terceron woman, the offspring are called Saltatras or retrogrades; because they take a step backwards towards the Negro blood. *Ibid.*

"In a country governed by whites, the families reputed to have the least mixture of Negro or Mulatto blood are naturally the most honored. Thus, in (Spanish) America, the greater or less degree of whiteness of skin decides the rank of an individual in society. A white, who rides barefooted on horseback, thinks he belongs to the nobility of the country. When a common man disputes with one of the titled lords of the country, he is frequently heard to say, 'Do you think me not so white as yourself?' It becomes, consequently, a very interesting business for the public vanity to estimate accurately the fractions* of European blood which belong to the different casts."

"It often happens that the families suspected of being of mixed blood demand from the high court of justice (Audencia) to have it declared that they belong to the whites. These declarations are not always corroborated by the judgment of the senses. We see very swarthy Mulattoes, who have the address to get themselves *whitened*. (This is the vulgar expression.) When the color of the skin is too repugnant to the judgment demanded, the petitioner is contented with an expression somewhat problematical. The sentence then simply bears, 'that such individuals may con-

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* The proportions are represented as follow, according to the principles sanctioned by usage :—

Parents.	*Offspring.*	*Degree of Mixture:*	
Negro and European	Mulatto	$\frac{1}{2}$ white	$\frac{1}{2}$ black.
European and Mulatto	Terceron	$\frac{3}{4}$ ——	$\frac{1}{4}$ ——
Negro and Mulatto	Griffo, or Zambo	$\frac{3}{4}$ black	$\frac{1}{4}$ white.
European and Terceron	Quarteron	$\frac{7}{8}$ white	$\frac{1}{8}$ black.
Negro and Terceron		$\frac{7}{8}$ black	$\frac{1}{8}$ white.
European and Quarteron	Quinterin	$\frac{15}{16}$ white	$\frac{1}{16}$ black.
Negro and Quarteron		$\frac{15}{16}$ black	$\frac{1}{16}$ white.

The two latter are respectively white and black ; and of these, the first are white by law, and consequently free, in our West-India Islands. All remains of color are so completely banished, that they are not distinguishable from whites in any respect.

sider themselves as whites (que se tengan por blancos.)"*

Where several races are brought together, as in some parts of Spanish America, and in some European-Asiatic settlements, their mixtures with each other, and the several crossings between the original races and their various descendants, give rise to a vast number of mixed breeds, and every possible variety of color. The dark races and all who are contaminated by any visible mixture of dark blood, are comprised under the general denomination of people of color. It is not, however, merely by this superficial character that they are distinguished; all other physical and moral qualities are equally influenced by those of the parents. The intellectual and moral character of the Europeans is deteriorated by the mixture of black or red blood; while, on the other hand, an infusion of white blood tends in an equal degree to improve and ennoble the qualities of the dark varieties.

The general law, that animals produce their like, by which uniformity of species is maintained, suffers some exceptions. Children do not always resemble their parents; and hence we have occasionally persons produced in each race with characters approaching to those of the other races. Among the white races of Europe scattered instances of individuals with skins nearly as dark as those of the Mongols or South-Sea Islanders are not unfrequent. I lately saw a girl, whose dark-olive skin and jet-black hair, very much like those of a Chinese, joined to English features, made me suppose that there was some mixture of blood: it turned out, however, that her parents were both English: the mother dark, but not of so deep a tint as the daughter, and the father fair. Among the Otaheiteans, descended from the Malay race, individuals with light brown or sandy hair, and fair complexion, are not very uncommon;† and FORSTER saw, in the island of Otaha, a man with a fair freckled skin and red hair.‡ Red-haired individuals have been observed in most of the dark nations; as, the Wotiaks, Eskimaux, islanders of New Guinea and New

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* HUMBOLDT *Polit. Essays*; i. 46, 247.

† FORSTER *Obs. on a Voyage round the World*: p. 229.

‡ *Ibid.* 230.

Zealand, and the Negroes.[*] The origin of Albinos, particularly in the dark races, is a remarkable example of native variety of color.

In the mixed breeds, too, although the children generally partake of the character of both parents, they sometimes resemble one only; and, in such a case, the influence of the other is often observed in the second or third generation. Children may be seen like their grandsires, and unlike the father and mother.

> Fit quoque, ut interdum similes existere avorum
> Possint, et referant proavorum sæpe figuras.
> *   *   *   *   *   *
> Inde Venus varias producit sorte figuras,
> Majorumque refert vultus, vocesque, comasque.
> LUCRET. lib. ii.

Thus it is possible that an African Albiness and an European may produce together a true Mulatto;[†] the offspring receiving its dark tint through the mother, although she has it not herself.

The offspring of a black and white may be either black or white, instead of being mixed; and in some rare cases it has been spotted.

A black man married a white woman in York: in due course of time she had a child that was entirely black, and very much like the father in color and features, without the least participation in the features or color of the mother. A Negro was married in London to a white woman, who afterwards had a daughter as fair as any one born of white parents, and like the mother in features, but her right buttock and thigh were as black as the skin of the father. Two Negro slaves having married in Virginia, the woman brought forth a white girl. The husband's father was white, his grandfather and grandmother black; and in every family related to them there had always been a white child.*

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[*] BLUMENBACH *de G. H. Var. Nat.* p. 169. He himself saw a Mulatto with red hair, of which he procured a specimen. A man of mulatto complexion, freckled, with strong red hair, disposed in small wiry curls, and born of black parents, was seen by WINTERBOTTOM, ii. 173; who met with others having red complexion and hair: i. 193.

[†] STEDMAN'S *Surinam*, ii. 260.

A Negress had twins by an Englishman; one was perfectly black, with short, woolly, curled hair; the other was light, with long hair.†

Dr. WINTERBOTTOM says, that in a family of six persons which he knew, one half was almost as light colored as Mulattoes, while the other was jet black. The father was a deep black, the mother a Mulatto.‡

Variations of color, analogous to those just enumerated, are of daily occurrence among animals; as in the production of black sheep, cats, horses, foxes, &c. White sheep may produce black lambs; and gray rabbits may bring forth either white (leucæthiopic) or black ones. The production of leucæthiopic animals from those of the ordinary color is very common. In the beaver, which is a wild animal, we have either black or leucæthiopic white ones produced from the common animal. Dr. BUCHANAN says of the asses in the Carnatic, that "some are of the usual ash color, whilst others are almost black, in which case the cross on the shoulders disappears. Milk white asses are also to be found, but they are rare. These are not varieties as to species; for black individuals have sometimes ash-colored colts; and, on the contrary, black colts are sometimes produced by ash-colored dams."‖

The common peacocks produced fourteen young: two were white, the rest resembled their parents.§

The native congenital varieties thus produced are propagated by generation, and become established as permanent breeds, if individuals with these new characters constantly intermix, and none others are admitted into the breed. Thus the leucæthiopic conssitution has become fixed in the white rabbit and ferret; and thus, before our eyes, as conspicuous a deviation from the common stock has been formed, as any in the human race. Black rams are always rejected in breeding, because they would transfer their color to their progeny. In many parts of England all the cattle are of one color: this arises from the long established custom of slaughtering all the calves which have not the desired tint. There is no reason to doubt, that if the same plan were adopted with the human subject,—that is, if persons marked by certain native peculiarities were united, their offspring again matched with similar individuals, and this constantly repeated,—any native variety might be fixed as a permanent breed. Human Albinos are too few for this purpose: hence we have no race in our species like the ferret or white rabbit.

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* These instances are related by D. PARSONS in the *Philos. Transact.* v. 55: and seem to be of unquestionable authenticity.

† WHITE *on the Regular Gradation*, p. 122.

‡ *On the Native Africans*; i. 188.

‖ *Journey from Madras through Mysore, &c.*; v. 1. p. 7

§ BUFFON; v. 12. p. 286, note.

The disposition to change is exhausted in one generation, and the characters of the original stock return, unless the variety is kept up by the precaution above mentioned, of excluding from the breed all which have not the new characters. Thus when African Albinos intermix with the common race, the offspring generally is black. The same circumstance is seen in vegetables; the seeds of our fine cultivated apples almost always produce the common crab; and the variegated holly can only be preserved as a variety by grafting: when we attempt to propagate it by seed, it returns to the common green holly. In considering this as an explanation of the mode in which varieties of color may have arisen in the human race, an objection will probably occur, that we do not, in point of fact, see Negroes, Americans, or Mongols, produced among the white races; nor Europeans among the former. The theory of unity of the species would be untenable, if it depended on proving that such varieties occur. But the Negro and the European are the two extremes of a very long gradation: between them are almost innumerable intermediate stages, which differ from each other no more than the individuals occasionally produced in every race differ from the generality of the race.

That the common opinion, which refers the characteristic differences of color in the varieties of the human species to climate, and particularly to the degree of solar heat, is entirely unfounded, will, I trust, be fully proved hereafter. Enough has now been said to show that these differences depend on the breed; and that the hue of the offspring follows that of the parents, excepting in the rare cases of native or congenital variety. The latter examples prove that color is not an essential character of race; that identity of tint is not necessary to establish descent from a common stock. These occurrences, together with the numerous examples of the widest deviation in color in animals confessedly of the same species, fully authorize us to conclude, that, however striking the contrast may be between the fair European and the ebon African; and however unwilling the former may be to trace up his pedigree to the same Adam with the latter, this superficial distinction is altogether insufficient to establish diversity of species.

Examples occur of individuals spotted with different colors; but they are by no means so common as those of spotted animals. Persons of the black race are sometimes marked by patches of white, of various size and number, without any thing like diseases of the skin. This circumstance has been observed most frequently in Negroes, and generally begins in early infancy; the individuals are called spotted or piebald Negroes; in French, *Nègres-pies*. Blumenbach has described a man of this kind, whom he saw in London: a servant to the person who kept the animals at Exeter Change. He was a young man, perfectly black, excepting the umbilical and hypogastric regions of the abdomen, and the middle of the lower limbs, including the knees and neighboring parts of the thighs and legs, which were of a clear and almost snowy whiteness, but spotted with black, like the skin of a panther. His hair was of two colors. On the middle of the front of the head, from the vertex to the forehead, where it ended in a sharp point, there was a white spot, with a yellower tinge than those on the trunk and legs. The hair covering this was white, but resembled the rest in other respects.[*] On comparing the picture of this man with three others (a boy and two girls,) he observes that the white spots occupied the abdomen and thighs, never appearing on the hands and feet, which parts, with the groins, are the first to turn black in the newly-born Negroes; and that the arrangement of the white parts was symmetrical. Both the parents of this man, and of the others,[*] of whom BLUMENBACH had collected accounts, were entirely black; so that BUFFON's conjecture of this variety being produced by the cohabitation of a Negro with an Albiness, is groundless.

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[*] *De G. H. Var. Nat.* sect. iii. § 48, *Abbildungen Natur-Historischer Gegenstände*; No. 21. Another spotted Negro is delineated in Buffon, *Supplement*. t. 4. 506. tab. 2.

These spots, in which the epidermis is perfectly healthy, and which are distinguishable from the rest of the skin only by their whiteness, are not to be confounded with diseases of the organ, where the cuticle becomes scaly or branny, which are frequent in some of the black races. Nor are they peculiar to dark-colored people. BLUMENBACH has seen two instances in Germans; one of a youth, the other of a man sixty years old. They both had a rather tawny skin, marked here and there with various sized spots of the clearest white. They appeared first in the former in infancy. and in the latter at the age of manhood.

The skin differs in some other properties besides its color. Travellers have described it as remarkably soft and smooth, and as it were, silky, in certain races; as in the Carib, Negro,[†] Otaheitean,[‡] and Turk. It secretes a matter of peculiar odour in some races. "The Peruvian Indians," says HUMBOLDT, "who in the middle of the night distinguished the different races by their quick sense of smell, have formed three words to express the odour of the European, the Indian American, and the Negro; they call the first pezuna, the second posco, and the third graio,"* He adds, that the casts of Indian or African blood preserve the odour peculiar to the cutaneous transpiration of those primitive races.

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[*] BYRD, in the *Philos. Transact.* v. 19. p. 781. mentions a boy, in whom the spots were first seen in the fourth year, and progressively increased. Mr. JEFFERSON mentions a Negro, born black of black parents, on whose chin, when a boy, a white spot appeared. It continued to increase till he became a man, when it had extended over the chin, lips, one cheek, the under jaw and neck of the same side. *Notes on Virginia*, p. 120. Another case is mentioned by MORGAN in *Transactions of the Philosophical Society of Philadelphia*, v. 2 p. 392.

[†] "Their skins are always cool, at least more so than those of Europeans in the same climate; and they are also remarkable for their sleekness and velvet-like softness." WINTERBOTTOM, *Account of the Native Africans*; i. 180.

[‡] HAWKESWORTH's *Collection of Voyages*; t. 2. p. 187.

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* HUMBOLDT, *Political Essay*, i. 245.

CHAPTER III.

On the Hair, Beard, and Color of the Iris.

Every part of our frame deserves to be attentively considered and investigated. The hair, which is found, in various form and quantity, over nearly the whole external surface, might seem at first view an excrescence hardly worthy of notice. We are soon struck, however, with the contrast between man and animals, in respect to this growth; with its general abundance over the whole body in the latter, and the comparative nakedness of the former; while in the head these proportions are reversed, and its copious and long growth, to which there is nothing parallel in animals, forms a distinguished and peculiar ornament, imparting a character of dignity and majesty to the human head. It presents, again, well-marked varieties in the different races of men: compare the short woolly knots on the head of the genuine Negro, or the coarse, straight, and thin hair of an American or Mongolian, together with their beardless faces, to the ample growth of fine and undulated locks and the full beard which so gracefully adorn the head and face of the Caucasian races. The physiologist will be interested in examining the relation between the hair and the integuments; and in noticing the sexual distinctions, which are more or less strongly marked by this production.

Implanted in the skin, and deriving from the cutaneous vessels the materials of its growth, the structure and properties of the hair are closely allied to those of this organ. The horny substance composing it is very analogous to that of the cuticle; and being equally destitute of vessels, nerves, sensibility, and all power of exhibiting vital processes, and may be regarded, like it, as dead matter.

Each hair may be traced, through the cuticle and surface of the cutis, to a bulb situated partly in the corion of the latter organ, and partly in the cellular texture which unites it to the subjacent parts. This bulb consists of a dense external covering, in which the tubular root of the hair, and a conical vascular pulp, by which that root is secreted, are contained.* The vascular body adds the new matter to the root of the hair, which is elongated by these additions, in the same way as the nail grows by its root. The conical vascular pulp, and the hollow of the hair in which it is lodged, are easily seen in the larger examples, which the whiskers of many mammalia afford. The precise relations of the cuticle and rete mucosum to the hair have not been ascertained; it is not settled whether these coverings are simply perforated, or whether productions of them are continued over the hairs. It is, however, clear that the coloring principle is of a common nature in the skin and hair; and, moreover, that there is a connection between them in texture.

The colorless Albino has a soft white hair. In the first or white variety of the human species, every gradation from the fair to the dark is accompanied by correspondent alterations in the tint of the hair. This is true, not only of nations, but of individuals, in the white races. A light complexion and thin skin are accompanied with delicate fair or red hair; a dark one and thick skin with black hair, almost invariably, even in individuals of the same family; a difference which, according to the philosophy of some writers, would be a sufficient ground for classing them in distinct species.

The four colored varieties of men have black hair, which is always stronger and coarser in texture than in the whites. This difference is particularly noticed by the Chinese, who contemptuously compare the hair of Europeans to the soft fur of the smaller animals. In Negroes, native Americans, and New-Zealanders, I have found the texture much stronger than in the darkest Europeans. A striking proof that the color of the hair depends on that of the skin is afforded by the spotted Africans, in whom the hairs growing out of a white patch on the head are white.*

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* See the article HAIR, in *Comparative Anatomy*, in the Cyclopædia of Dr REES; contributed by Dr. MACARTNEY, Professor of Anatomy in Trinity College, Dublin.

The principal differences of the hair may be brought under the four following heads:

1. Brownish, deviating into yellow (flaxen) or red on one side, and black on the other; copious, soft, long, and forming more or less distinct ringlets or undulations. It is seen in the temperate climates of Europe, and its light shades formerly attracted particular notice in the ancient Germans. The thin-skinned Albino has the softest and most colorless hair: in the Germanic race it is also very soft and light-colored; and red hair is usually found in conjunction with a thin and soft skin. The Celtic and Slavonic races, which make up the chief population of Europe, the eastern Asiatics, and northern Africans, have generally, with a rather thicker and darker skin, stronger, black, or dark brown, and more or less curling hair.

The lighter and darker kinds of hair will grow to very considerable lengths in Europeans, when not cut.†

2. Black, strong, straight, and thin; in the Mongolian and American varieties. The greater part of the head is shaved by the Chinese; the portion of hair which they leave, often reaches the ground. The same remark holds good of the Americans.‡

3. Black, softer, dense, copious, and curled; in most of the South-Sea Islanders.

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* BLUMENBACH *Abbildungen N. H. Gegenstände, No.* 21. WHITE *on the Regular Gradation*, &c. p. 145.

† WHITE mentions an Italian lady, in whom the hair trailed on the ground when she stood upright: the same observation may be made of the Greek women. A Prussian soldier had it long enough to reach the ground; and in an English lady it was six feet long. *On the Regular Gradation*, &c. p. 93—4.

‡ Mr. HEARNE says, that the North-American savages leave a single lock on the head; and that he saw some, nearly six feet high, in whom, when let down, it would trail on the ground, as they walked. *Journey to the Frozen Ocean*, p. 305, note.

4. Black and crisp, so as generally to be called woolly; common to all the Negro tribes. This is either formed into small and short masses, or it may admit of being combed to the length of three or four inches, still forming a kind of general woolly fleece.

The analogy, on which the hairy covering of the Africans has been called wool, is quite a loose one, and goes no further than a slight resemblance in appearance. The filament of wool is rough on the surface; in hair it is smooth. The latter is of a uniform thickness throughout, or rather slenderer towards the point, while the former is unequal in size, and larger towards its end. The thicker part is said to be produced in the summer; the thinner in the winter months. In a variety of experiments made by Dr. ANDERSON,* he always found that the growing part of the fibre of wool varied in thickness with the temperature of the season; being thickest in summer, smaller in spring and autumn, and smallest of all in the winter. Another distinction of wool is, that it falls off altogether in a mass: while human hairs always drop off singly, and from time to time.

The above division is sufficient as a general one; but there are some exceptions to it. Woolly hair is not confined entirely to the Africans; nor is the black color invariably found in all the three last varieties. BRUCE describs the Gallas as having long hair; and some brown people (as those of the Duke of York's Island near New Ireland in the South Pacific) have it strongly curled.

In the Papuas of New Guinea it is completely frizzled and woolly; but so much longer than in the Negroes, that when fully dressed out, according to their favorite fashion, it forms a round bush of three feet† in diameter, quite eclipsing our most dignified legal and theological wigs.

The New Hollanders and the natives of Van Diemen's Land form so complete a medium between the woolly-haired African, and the copious curling hair of the other South-Sea Islanders, that we are completely puzzled how to class them. The difficulty is greater when we find in this one race many individuals with the short crisp knots of the genuine Negro,* and others with hair of considerable length.†

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* WHITE *on the Regular Gradation*, p. 95.

† FORREST'S *Voyage to New Guinea*.

Individual instances of red hair occur in the three‡ dark-colored varieties of men; and the soft white hair of the Albino is occasionally seen in all of them.

The animal kingdom furnishes us with numerous parallel varieties in the color and texture of the hair; as, for example, in the black sheep, in the black and white horses, in the various hues of cattle; in the white, black, brown, or spotted rabbits; all undoubtedly produced from the original gray stock.

Sheep exhibit every kind of covering, from the soft and delicate fleeces of Thibet and Spain, to the coarse and rough hair, which takes the place of wool in very warm countries. There is a mixture of hair with the wool in the argali, the supposed wild original of our flocks. The sheep of some of the Tartar tribes have a similar mixture; and the same thing will occur in this country where the breed is neglected. In these cases, if the animals with the best fleeces are selected to breed from, and this rule be observed constantly, the wool would be gradually improved, and the hairs disappear; or, vice versâ, the sheep would become entirely hairy.

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* PERON *Voyage de Découvertes aux Terres Australes;* p. i.; pl. 8, 10, 11, 12. The individual represented in pl. 11. is a complete Negro in color and hair: all these are natives of Van Diemen's Land. Captain COOK says that their hair is as woolly as that of any Negro; *Voyage to the Pacific;* i. 96; and Mr. ANDERSON concurs in this representation; ibid. 112.

† PERON, *ibid*, pl. 17. represents a New Hollander with large and loose curls: in pl. 18, and 21, the curl is not considerable; and in the former the hair is very long. In an individual who came to England, and had learned to pay attention to cleanliness and dress, the hair was long and copious. COLLINS' *Account of New South Wales*, p. 554; and portrait, p. 439.

"Les habitans de la terre de Diemen ont les cheveux courts, laineux et crépus; ceux de la Nouvelle Hollande les ont droits, longs, et roides." PERON vol. 2. p. 164.

‡ Red-haired Africans and Mulattoes are mentioned by WINTERBOTTOM, *on the Native Africans*, i. 193; BLUMENBACH, *De Gen. Hum. Var. Nat.* p. 169; and others. CHARLEVOIX mentions similar facts of the Eskimaux, *Hist. de la Nouv. France*, iii. 179; GMELIN of the Wotiaks, *Reise durch Sibirien*, i. 89; and SONNERAT of the Papuas, *Voy. a la Nouv. Guinée*, 153. FORSTER saw individuals with yellowish brown or sandy hair at Otaheite; *Obs. on a Voyage round the World;* p. 229; and a single man at Otaha (one of the Friendly Islands) with perfectly red hair (*ibid.* 230.) Among the tawny and black-haired natives of Chinese Tartary, and of the neighboring great island of Tchoka or Sagalien, individuals were seen with chesnut-colored hair. ROLLIN in PEROUSE'S *Voyage;* v. iii. pp. 235, 242. Instances of brown and fair (blond) hair occur among the Mongolian tribes, according to PALLAS, but they are very rare. *Sämmlungen über die Mongolischen Volkerschaften;* 1r th. p. 100.

Goats, rabbits, and cats in Angora, a small district of Asia Minor, are remarkable for the length and softness, as well as snowy whiteness of their coverings.

If these goats, and those furnishing the material from which the precious shawls of Cashmere are fabricated, are of the same species with our domestic animal, and with the wild goats considered as its original stock, the variation far exceeds what we observe in the hair of the various human races; and this, together with the examples of the dog and sheep, will prove to us that a difference in the hair is not a sufficient ground for establishing a distinction of species.

The various races of mankind exhibit considerable differences in the beard and the hair on other parts of the body, as well as in that of the head. One of the most general characters of the dark colored nations, at least of those which belong to Mongolian, American, and African varieties, is either an entire want of beard, or a very thin one developed at a more advanced age than is usual with us: on the contrary, a copious beard has always been the pride of the white races; and, from its being a distinguishing attribute of the male, has been commonly regarded as a mark of masculine strength. Dark-colored nations with strong beards are as uncommon as individuals of the white races with an inconsiderable growth of this covering. A general smoothness of the whole body is combined with this diminution of the beard; and these characters are rendered more striking by the very common practice among the dark-colored nations of carefully eradicating or destroying the hair; which affords another example of their great disposition to exaggerate by artificial means whatever may be deemed imperfect or defective in their bodily formation. In some instances, neither the eyebrows nor the eyelashes* are spared; nor even the hair of the head.†

The beardlessness of the Mongolian variety, which attracted the attention of the older writers,‡ has been fully confirmed by the testimonies of modern travellers. "In all the Mongolian tribes," says **Pallas**, "the adult males have much less beard than in the Tartar and European nations: it also grows later. The Calmucks have the most, yet they are very poorly furnished: they commonly have small mustachios, and some preserve besides a tuft on the lower lip." "They have very little hair on the body, and the mothers seek to exterminate it in their children. But in certain parts, which the Tartar women like to keep quite smooth, those of the Calmucks leave the hair undisturbed."|| "The Mongols have less beard and thinner hair on the head than the Calmucks. The Burats are nearly as beardless as the Tungooses and other hordes of Eastern Siberia. Without any means of destruction having been resorted to, their chin often remains quite smooth, even to advanced age. It is not common to see a Burat with a beard at the usual commencement of adult age; and they are constantly smooth and bald in the rest of the body."§ **Gmelin** observes, "that it is not easy to find a beard among the Tungooses or the neighboring tribes: for they eradicate the hair as soon as it appears; and repeat this constantly, till at last no more is produced."¶

The Chinese resemble the Mongolian tribes, to which they owe their origin, in this deficiency of beard, although they preserve it, and encourage the growth as much as they can.**

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* **Dobrizhoffer** *de Abiponibus*; ii. 26.

† **Hearne** of the Eskimaux on the Copper-Mine River: "There is one custom prevalent among them, viz. that of the men having all the hair of their heads pulled out by the roots," &c *Journey to the Frozen Ocean*, p. 170.

‡ **Ammianus Marcellinus** says of the Huns, "Senescunt imberbes, absque ulla venustate." xxx. 2. Thinness of the beard is one of the traits ascribed by **Jornandes** to **Attila**: "rarus barba."

|| *Sammlungen üb die Mongol Volkersch.* 1r. th. p. 100.

§ *Sammlungen üb die Mongol. Volkersch,* 1r. th. p. 171.

¶ *Reise durch Sibirien*; ii. 125.

** The Booteeas, or inhabitants of Botan, have all the characters of the

The practice of extermination is mentioned by KÆMPFER as prevalent in Japan and among the Malays; by FORREST, among the Mindanao islanders; WILSON, in the Pelew Islands; LANGSDORFF, in the Marquesas:[*] CARTERET, among the Papuas: BOUGAINVILLE, in the Navigators' Islands; Mr. MARSDEN, in Sumatra;[†] &c. &c.

There has been a great dispute about the Americans; some asserting their entire and natural want of beard, and assigning this as a proof of their physical inferiority, of that degeneracy, which is supposed to have affected all animal nature in the New World: while others are inclined to ascribe the apparent difference entirely to the practice of eradication.

We have abundant evidence that the American race is characterized generally by a small and imperfect beard; yet there are tribes, particularly in North America, with a more copious growth. The tall and robust stature of some American nations which have little beard, proves that the absence of this excrescence is not a sure sign of weakness;[‡] while its existence in the New Holland-

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Mongolian variety, and the deficiency of beard with the rest. "Their skins are remarkably smooth; and most of them arrive at a very advanced age, before they can boast even the earliest rudiments of a beard." "Their eyelashes are so thin as to be scarcely perceptible," TURNER, *Embassy to the Court of the Teshoo Lama*, p. 84-5

[*] "The natives of Nukahiwah consider an entirely smooth skin a great beauty, and therefore eradicate the hair under the arms and from the breast." *Voyages and Travels*, &c. p. 114.".

[†] "The men are beardless; and have chins so remarkably smooth, that were it not for the priests displaying a little tuft we should be apt to conclude that nature had refused them this token of manhood. It is the same with respect to other parts of the body in both sexes; and this particular attention to their persons they esteem a point of delicacy, and the contrary an unpardonable neglect. The boys, as they approach the age of puberty, rub their chins, upper lips, and those parts of the body that are subject to superfluous hair, with chunam (quick-lime, especially of shells,) which destroys the roots of the incipient beard. The few piles that afterwards appear, are plucked out with tweezers, which they always carry about with them for that purpose." *Hist. of Sumatra*; Ed. 3. p. 45.

[‡] "The Mexicans, particularly those of the Aztek and Otomite races, have more beard than I ever saw in any other Indians of South America. Almost

ers,[*] the people of Tanna Mallicolla,[†] &c. shows that its presence does not necessarily indicate vigor or beauty.

The very competent and respectable testimony of Ulloa, establishes a general deficiency of beard among the South Americans. "The Indians have no beard: and the greatest alteration occasioned by their arriving at the years of maturity is only a few straggling hairs on the chin; but so short and thin, as never to require the

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all the Indians in the neighborhood of the capital wore small mustachios, and this is even a mark of the tributary cast. These mustachios, which modern travellers have also found among the inhabitants of the north-west coast of America, are so much the more curious, as celebrated naturalists have left the question undetermined, whether the Americans are naturally destitute of beard and of hair on the rest of their bodies, or whether they pluck them carefully out. Without entering here into physiological details, I can affirm that the Indians who inhabit the torrid zone of South America have generally some beard; and that this beard increases when they shave themselves, of which we have seen examples in the missions of the Capuchins of Caripe, where the Indian sextons wish to resemble the monks their masters. But many individuals are naturally destitute of beard and hair on their bodies.

"Mr. De Galeano, in the account of the last Spanish expedition to the Straits of Magellan, informs us that there are many old men among the Patagonians with beards, though they are short, and by no means bushy. (*Viaje al Estrecho de Magalhaens*, p. 331.) On comparing this assertion with the facts collected by Marchand, Mears, and especially Mr. Volney, in the northern temperate zone, we are tempted to believe that the Indians have more and more beard in proportion to their distance from the equator. However, this apparent want of beard is by no means peculiar to the American race; for many hordes of Eastern Asia, and especially many tribes of African Negroes, have so little beard, that we should be almost tempted to deny its existence. The Negroes of Congo, and the Caribs, two eminently robust races, frequently of a Colossal stature, prove, that to look on a beardless chin as the sure sign of the degeneration and physical weakness of the human species, is a mere physiological dream. We forget that all which has been observed in the Caucasian races does not apply equally to the Mongol or American race, or to the African Negroes." Humboldt, *Political Essay*, v. i. pp. 147, 148.

[*] Collins' *Account of the English Colony in New South Wales*; p. 550.

[†] The Mallicollese have strong, crisp and bushy beards; although they are called "an ape-like nation," and the ugliest seen in the South Sea. Cook, *Voyage towards the South Pole*; v. ii. p. 34, plate 47. Of the Tannese and New Caledonians, see ibid. p. 118, plates 26 and 39; and Forster's *Observations*, p. 238.

assistance of a razor."[*] He states in another place,[†] that gray hair and beards indicate in the American race a very advanced age: the former is not seen till before or about the seventieth year; the latter about the age of sixty, and then slender and thin. Bouguer,[‡] Charlevoix,[||] the Chevalier De Pinto,[§] Dobrizhoffer,[¶] Molina,[**] and Humboldt,[††] give similar testimony on this point.

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[*] *Travels in South America*, v. i. p. 267.

[†] *Noticias Americanas*, v. 2. It is translated into German and French.

[‡] Of the Peruvians, "Ils n'ont point de barbe, ni de poil sur la poitrine, ni en aucun endroit du corps." *Mém de l' Acad. des Sciences*, 1740, p. 274

[||] *Journal Historique*. p. 311.

[§] In Robertson's *History of America*; i. 460.

[¶] *De Abiponibus*, ii. 6, 25, & seq.

[**] "The Chilians, like the Tartars, have but little beard; and the custom of plucking out the hair, as fast as it grows, makes them appear as if beardless: for this purpose they always carry with them a small pair of pincers, which forms a part of their toilette. There are some of them, however, who have as thick a beard as the Spaniards. The hair which marks the age of puberty they have in still greater quantities than the beard. The opinion that a thin beard is the mark of a feeble body is not verified in the case of these people. The Indians are generally vigorous, and are better able to endure fatigue than the Creoles: for which reason they are always preferred in those employments that require strength." *Natural History of Chili*, p. 275.

The Araucans "have scarcely any beard, and the smallest hair is never to be discerned on their faces, from the care they take to pluck out the little that appears." "The same attention is paid to removing it from their bodies, where its growth is more abundant." *Civil History of Chili*, p. 55

[††] "The Chaymas are almost without beard on the chin, like the Tungooses, and other nations of the Mongol race. They pluck out the few hairs that appear; but it is not correct to say that they have no beard, merely because they pluck out the hairs. Independently of this custom, the greater part of the natives would be nearly beardless." No controversy would have arisen on this point, if the correct account given by the first historians of the conquest of America had been sufficiently attended to. (See the *Journal* of Pigafetta, published by Amoretti, 1800, p. 18. Benzoni, *Storia del Mundo Nuovo*. 1572, p. 85. Bembo, *Hist. Venet.* 1557, p 86. "The Patagonians and Guaranies in South America have beards. When the Chaymas, instead of extracting the little hair they have on the skin, shave themselves frequently, their beard grows. I have seen this experiment tried with success by young Indians, who served at mass, and who anxiously wished to resemble the Capuchin fathers, their missionaries and instructers. Most of the people, however, have as

There is some contradiction in the reports of travellers concerning the native North Americans: it is, however, easily explained on the probable supposition that the proportion of the beard varies in different tribes.

Mr. **Hearne** observed of those whom he saw on his journey to the Copper-Mine River, that " few of the men have any beard: this seldom makes its appearance till they are arrived at middle age; and then in by no means equal quantity to what is observed in the generality of Europeans; the little they have, however, is exceedingly strong and bristly." He mentions the practice of eradication; adds, that " neither sex have any hair under their arm-pits, and very little on any other part of their body, particularly the women.[*]

Mr. **Mackenzie** states that the Knisteneaux " very generally extract their beards; and both sexes manifest a disposition to pluck the hair from every part of their body and limbs."[†] Among the Chepewyans, " the men in general extract their beards; but some are seen to prefer a bushy black beard to a smooth chin.[‡]

Respecting the Canadian Indians and the adjoining tribes, we have a curious statement in the *Philosophical Transactions*,[||] communicated by a celebrated Mohawk chief named **Thayandanegga**,

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great an antipathy to the beard as the Eastern nations have veneration for it. This antipathy is derived from the same source as the predilection for flat foreheads, which is seen in so singular a manner in the statues of the Azteck heroes and divinities. Nations attach the idea of beauty to every thing which particularly characterizes their own physical conformation, their natural physiognomy. Hence it results, that if nature has bestowed very little beard, a narrow forehead, or a brownish red skin, every individual thinks himself beautiful, in proportion as his body is destitute of hairs, his head flattened, and his skin covered with annotto and chica, or some other coppery red color." *Personal Narrative*, iii. 237.

[*] *Journey*, ch. 9. p. 305.

[†] *Voyages*, &c. p. 92.

[‡] *Voyages*, &c. p. 120.

[||] For the year 1786, art. 11. communicated by Mr. M'Causland, an army surgeon, who had resided for ten years at Niagara, in the midst of the Six Nations, and who confirmed the statement of the American chief.

but better known to the English by the name of Captain **Brant**, whose portrait is represented in the First Part of **Blumenbach's** *Delineations*.

"The men of the Six Nations have all beards by nature, as have likewise all other Indian nations of North America, which I have seen. Some allow a part of the beard on the chin and upper lip to grow; and a few of the Mohawks shave with razors like Europeans; but the generality pluck out the hairs of the beard by the roots, as soon as they begin to appear; and as they continue this practice all their lives, they appear to have no beard, or at most only a few straggling hairs, which they have neglected to pluck out. I am, however, of opinion, that if the Indians were to shave, they would never have beards altogether so thick as the Europeans; and there are some to be met with, who have actually very little beard."

The beardlessness of the natives of Nootka Sound is ascribed by **Cook**[*] entirely to their practice of eradication; and the same opinion is expressed respecting the Chopunnish, a tribe on Lewis's River, which joins the Columbia, by Captains **Lewis** and **Clarke**, who are of opinion that several of them would have good beards, if they adopted the practice of shaving.[†]

Perouse[‡] reports, that about one half of the adult Indians in New California had beards, which in some were ample; that he could not ascertain whether the deficiency observed in the others arose from natural defect, or from the beard being plucked out.

The genuine Negroes have very little growth of hair on the chin,[||] or on other parts of the body. In a full-grown lad of seven-

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[*] "Some have no beards at all; and others only a thin one on the point of the chin. This does not arise from an original deficiency of hair in those parts, but from their plucking it out by the roots; for those, who do not destroy it, have not only considerable beards on every part of the chin, but also whiskers, or mustachios running from the upper lip to the lower jaw obliquely downwards." *Voyage to the Pacific*, v. 2. p. 302. Pl. 38. Man of Nootka Sound: Pl. 46. Man of Prince William's Sound.

[†] *Travels to the Source of the Missouri* p. 556—7.

[‡] *Voyage*, v. ii. p. 197—8.

[||] **De Bry** states of the Congo Negroes, "Barbæ parum habent; videas enim teen, there was not the smallest appearance of beard, nor of hair on any other part except the head. I never saw any hair on the arms, legs, or breasts of Negroes, like what is observed on these parts in Europeans.

Although the South-Sea Islanders come under the dark-colored division of the human race, they are not at all deficient in beard. The description and figures of COOK concur in assigning to them in many cases a copious growth.*

That a similar connexion in point of color to that which I have just explained between the skin and the hair exists also between the former organ and the eyes, was noticed by ARISTOTLE, who observed that white persons have blue, and dark ones black eyes. Thus, in European countries, newly-born children have generally light eyes and hair, and both grow gradually darker together in individuals of dark complexion. Again, in proportion as the hair turns gray in the old subject, the pigmentum of the eye loses much of its brown color.† With the colorless skin and hair of the Albinos, is combined an entire deficiency‡ of coloring matter in the eye; so that the iris and choroid have a more or less red hue with a tendency to violet, from the color of the blood in their numerous capillaries. Different children of the same family not un-

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trigesimum ætatis agentes annum, quorum genas vix lanugo vestire cœpit tenerrissima."

* The portrait of POTATOW, an Otaheitean chief, has beard enough for a Jewish Rabbi. *Voyage towards the S. Pole*, v. i. p. 159, pl. 56. New Zealander, v. ii. p. 152. pl 55. See also the portrait of TIARRAH, a New-Zealand chief, prefixed to SAVAGE'S *Account of New Zealand*. The representations of the Tannese, Mallicollese, and New Caledonians have been already quoted; note ‡, p. 274. Man of Mangeea; folio atlas to the *Voyage to the Pacific;* pl. 11.

† Pigmentum *nigrum* is an incorrect expression as applied to the human eye, in which the matter in question, whether in the choroid membrane or on the uvea, is always brown. It is neither black, nor of a tint that could be mistaken for it, even in the darkest races; although it is of a deep black in our common quadrupeds.

‡ In his "*Observations on the Pigmentum of the Eye*," Mr. HUNTER speaks of the white pigmentum of the Albino, white rabbit, white mouse, ferret, &c. *Obs. on the Animal Economy*. It seems to me easily demonstrable, that there is no coloring matter in these cases; and that the light rose color of the iris and the deeper violet-red of the pupil, depend solely on the blood.

frequently have opposite complexions, where one of the parents is fair and the other dark: hence we may see brothers and sisters with different colored irides.

Those animals only, in which the skin and hair are subject to variety of color, vary in that of the eyes. This is not confined, as the ancients thought, to man and the horse, but extends also to others, particularly of the domesticated kinds. Moreover, the iris sometimes exhibits more than one color in those animals which have a spotted skin; as was noticed by MOLINELLI* in dogs. Something of the same kind may be observed in sheep and horses; but BLUMENBACH says that it is most conspicuous in the rabbit; the gray, or those which retain the native color of their wild state, have brown irides; those spotted with black and white have the irides evidently variegated; and the white, like other leucæthiopic animals, have them, as is well known, of a pale rose color.

The three principal colors of the human eye were well laid down by ARISTOTLE; viz. blue, passing in its lighter tints to what we call gray; an obscure orange, which he calls the color of the eye in the goat (Fr. *yeux de chèvre,)* a kind of middle tint between blue and orange, and sometimes remarkably green in men with very red hair and freckled skin; and lastly brown in various shades, forming in proportion to its depth what we call hazel, dark, or black eyes. The red eyes of the leucæthiopic constitution may constitute a fourth division.

These may all occur in different individuals of the same race, or even of the same family: and again, they are sometimes confined to the distinct tribes of the same country within the limits of a few degrees. Thus LINNEUS† describes in Sweden the Gothlander, with light hair and grayish blue eyes; the Fin with yellow hair and brown iris; and the Laplander with black hair and eyes.

Blue eyes, as well as yellow hair (cærulei oculi, rutilæ comæ,‡) have characterized the German race from the earliest times; and the same combination is met with, in scattered instances, in the most remote nations. The iris of the Negro is the blackest we are acquainted with; so that close inspection is necessary, in living individuals, to distinguish it from the pupil. It is invariably dark in all the colored tribes of men; as well as in the dark-complexioned individuals of the white variety

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* *Comment. Instit. Bonon.* t. iii. p. 281.

† *Fauna Suecica*, p. 1.

‡ TACITUS. *Germ.* 4. "Rutilus," is applied to splendid or shining objects, as

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fire and flame; and denotes frequently the color of gold, as in this case. Thus it has here the same meaning as the "auricomi" of Silius, applied to the Batavi, and the epithet "golden-haired," so common among the earlier German writers.

CHAPTER IV.

Differences of Features.—Forms of the Skull.—Teeth.—Attempted Explanations.

Although it is a common and very just observation, that two individuals are hardly to be met with possessing exactly the same features, and although this variety, according with what we observe throughout all nature,* is a simple and effectual provision for very important ends, yet there is generally a certain cast of countenance common to the particular races of men, and often to the inhabitants of particular countries. The five following varieties are established by **Blumenbach**,† after a careful comparison of numerous drawings, and of the various races themselves, in situations where commerce attracts them from all parts of the globe, as at London and Amsterdam. This distribution is only meant to indicate the most leading traits: details and minute particulars are not therefore taken into consideration.

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* "Præterea genus humanum, mutæque natantes
Squamigerum pecudes, et læta armenta, feræque,
Et variæ volucres; lætantia quæ loca aquarum
Concelebrant, circum ripas, fonteisque, lacusque;
Et quæ pervolgant nemora avia pervolitantes;
Horum unum quodvis generatim sumere perge:
Invenies tamen inter se distare figuris.
Nec ratione alia proles cognoscere matrem,
Nec mater possit prolem: quod posse videmus,
Nec minus atque homines inter se nota cluere."
Lucret. l. ii.

† *De Gen. Human. Var. Nat.* Sect. iii. § 56.

1. An oval and straight face, with the different parts moderately distinct from each other; high and expanded forehead; nose narrow, and slightly aquiline, or at least with the bridge somewhat convex; no prominence of the cheek-bones; small mouth, with lips slightly turned out, particularly the lower one; a full and rounded chin.

This is the kind of countenance which accords most with our ideas of beauty: it may be considered as a middle, departing into two extremes, exactly opposed to each other in most respects, yet agreeing in having a low and receding forehead. In one, the face is expanded laterally; in the other, it is lengthened forwards or downwards. Each of these includes two varieties, which are most readily distinguished by a profile view; one, in which the nose and other parts run together; and the other, in which they are more prominent and separate.

2. Broad and flattened face, with the parts slightly distinguished, and as it were running together: the space between the eyes flat and very broad, flat nose, rounded projecting cheeks: narrow and linear aperture of the eyelids extending towards the temples, *(yeux bridés*, Fr.) the internal angle of the eye depressed towards the nose, and the superior eyelid continued at that part into the inferior by a rounded sweep; chin slightly prominent.

This is the face of the Mongolian tribes; commonly called in English the Tartar face, from the confusion of the Tartars (Tartars) with the Mongols.

3. Face broad but not flat and depressed, with prominent cheekbones; and the parts, when viewed in profile, as it were more deeply and distinctly carved out. Short forehead, eyes deeply seated, nose flattish, but prominent. Such is the countenance of most Americans.

4. Narrow face projecting towards its lower part; narrow, slanting, and arched forehead; eyes prominent *(à fleur de tête ;)* a thick nose, confused on either side with the projecting cheeks *(nez épaté ;)* the lips, particularly the upper one, very thick; the jaws prominent, and the chin retracted. This is the countenance of the Negro—the Guinea face.

5. The face not so narrow as in the preceding, rather projecting downwards, with the different parts in a side-view rising more freely and distinctly. The nose rather full and broad, and thicker towards its apex (bottle-nosed.) The mouth large. This is the face of the Malays, particularly of the South-Sea Islanders.

In his *Abbildungen Natur-Historischer Gegenstände*, pl. 1. BLUMENBACH has given characteristic representations of these five varieties, engraved from accurate portraits of celebrated individuals.*

In features, as in color, the different races are connected to each other by the most gentle gradations; so that, although any two extremes, when contrasted, appear strikingly different, they are joined by numerous intermediate and very slightly different degrees; and no formation is exhibited so constantly in all the individuals of one race, as not to admit of numerous exceptions.

We see, indeed, an astonishing difference, when we place an ugly Negro (for there are such as well as ugly Europeans) against a specimen of the Grecian ideal model; but, when we trace the intermediate gradations, the striking diversity vanishes. "Of the Negroes of both sexes," says BLUMENBACH, "whom I have attentively examined, in very considerable number, as well as in the portraits and profiles of others, and in the nnmerous Negro crania, which I possess or have seen, there are not two completely resembling each other in their formation: they pass, by insensible gradations, into the forms of the other races, and approach to the other varieties even in their most pleasing modifications. A Creole whom I saw at Yverdun, born of parents from Congo, and brought from St. Domingo by the Chevalier TREYTORRENS, had a countenance of which no part, not even the nose, and rather strongly marked lips, were very striking, much less displeasing; the same features with an European complexion would certainly have been generally agreeable."* The testimony of LE MAIRE, in his journey to Senegal and Gambia, is to the same effect; and there are Negresses, except in color, as handsome as European women. VAILLANT says of the Caffre women, that setting aside the prejudice which operates against their color, many might be accounted handsome, even in an European country. The accurate ADANSON confirms this statement, in his description of the Senegambians. "The women are equally well made with the men. Their skin is of the finest texture, and extremely soft. The eyes are black and large; the mouth and lips small; and all the features well proportioned. Several are perfectly beautiful. They have much vivacity; and an easy air, which is very pleasing.†

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* 1. CAUCASIAN VARIETY.—*Jusuf Aguiah Efendi*, a Turk, formerly Ambassador from the Porte at the Court of London.

2. MONGOLIAN VARIETY.—*Feodor Iwanowitsch*, a Calmuck, sent when young by the Empress of Russia to the Hereditary Princess of Baden, educated at Carlsruhe , and afterwards a celebrated Engraver at Rome.

3. AMERICAN VARIETY —*Thayandaneega*, a Chief of the Mohawks or Six Nations, whose statement respecting one of the physical characters of his countrymen is quoted from the *Philosophical Transactions*· at p. 277.

4. ETHIOPIAN VARIETY.—*J. J. E. Capitein*, a Negro, who received Holy Orders in Holland.

5. MALAY VARIETY.—*Omai*, a native of Ulictea, one of the Friendly Islands, brought to England in 1773, and carried back by COOK in his last voyage.

Vignettes illustrating the same subject are introduced in the *Beyträge zur Naturgeschichte;* 1r theil.

The Jaloffs, according to MUNGO PARK, have not the protuberant lip nor flat nose of the African countenance.‡ We have also the testimony of another traveller concerning this tribe, to the same effect: according to MOORE,|| they have handsome features, and neither broad noses nor thick lips. PIGAFETTA§ states, that the Congo Negroes have not the thick lips of the Nubians, and that, except in color, they are very like the Portuguese. DAMPIER, in his account of Natâl, describes the natives as having curled hair, but a long face, well-proportioned nose, and agreeable, countenance. The six Negro crania engraved in the two first de-

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* *Beyträge zur Naturgeschichte*; 1r. th. p. 89

† *Histoire Naturelle du Sénégal*, p. 22.

‡ *Travels into the Interior Districts of Africa*; 8vo. edition, p. 23. The Foulahs also have pleasing features, p. 25.

|| ZIMMERMANN *Geograph. Geschichte*, v. 1. p. 99.

§ *Relazione del Reame di Congo*; Roma, p. 12.

cades of Blumenbach, exhibit very clearly this diversity of character in the African race: and prove, most unequivocally, that the variety among individuals is certainly not less, but greater, than the difference between some of them and many Europeans.*

The same observations hold good of the American race. The most accurate observers treat with contempt the hyperbolical assertion of some, that all the inhabitants of the New World have one and the same countenance, so that he who has seen one may say that he has seen all.

"I cannot help smiling," says Molina, "when I read in certain modern authors, and those too accounted diligent observers, that all the Americans have one cast of countenance; and that when you have seen one, you know the whole. These writers have been too much influenced by the deceptive appearances of resemblance, consisting chiefly in color, which immediately disappear when we confront individuals of two nations. The difference between an inhabitant of Chili and a Peruvian is not less than between an Italian and a German. I have found the Indians of Paraguay, of the Straits of Magellan, and of other parts, most obviously and strikingly distinguished from each other by peculiar lineaments."†

We have further unexceptionable testimony to prove that the same variety of countenance is found in the Americans as in other races; although it generally follows the model above described. In South America only we have the Caaiguas with flat noses, observed by Nic. del Techo; the neighboring Abipons, of whom many individuals have aquiline noses, by Martin Dobrizhoffer; the Peruvians with narrow and aquiline noses, by Ulloa; the Chilese with rather a broad nose, by Molina; and the islanders of Tierra del Fuego, with a very depressed one, by G. Forster.

The truth of this representation is most fully attested by Humboldt, whose accuracy and extensive opportunities entitle his observations to the most implicit deference. "In the faithful portrait which an excellent observer, Mr. Volney, has drawn of the

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* *Decas Craniorum*, p. 22. *Decas altera*, p. 13.

† *Storia Naturale del Chili*, p. 336. English Translation, 274-5.

Canada Indians, we undoubtedly recognise the tribes scattered in the meadows of the Rio Apure and the Carony. The same style of feature exists, no doubt, in both Americas: but those Europeans who have sailed on the great rivers Orinoco and Amazon, and have had occasion to see a great number of tribes assembled under the monastical hierarchy in the missions, must have observed, that the American race contains nations whose features differ as essentially from one another, as the numerous varieties of the race of Caucasus, the Circassians, Moors, and Persians, differ from one another. The tall form of the Patagonians is again found by us, as it were, among the Caribs, who dwell in the plains from the delta of the Orinoco, to the sources of the Rio Blanco. What a difference between the figure, physiognomy, and physical constitution of these Caribs, who ought to be accounted one of the most robust nations on the face of the earth, and are not to be confounded with the degenerate Zambos, formerly called Caribs of the island St. Vincent, and the squat bodies of the Chayma Indians of the province of Cumana! What a difference of form between the Indians of Tlascala and the Lipans and the Chichimecs of the northern part of Mexico!"*

An analogous variety of countenance has been noticed in the Friendly Islanders; "their features are very various, insomuch that it is scarcely possible to fix on any general likeness by which to characterize them, unless it be a fulness at the point of the nose, which is very common. But, on the other hand, we met with hundreds of truly European faces, and many genuine Roman noses, amongst them."†

Individuals in Europe often have the countenance exactly resembling the Negro or Mongol face.

From our survey of the countenance we proceed, by a natural and easy transition, to a consideration of the bony head. It is sufficiently obvious that there must be a close connexion between the external soft parts of the face, or the features, and the bony fabric, or mould, on which they are formed and supported;—that the size and configuration of the latter must determine those of the former.* We might venture to affirm, that a blind man, if he knew the vast difference which exists between the face of a Calmuck and that of a Negro, would be able to distinguish their skulls by the mere touch; nor could you persuade any person, however ignorant of the subject, that either of these belonged to a head similar to those from which the divine examples of the ancient Grecian sculpture were copied. Differences equally striking are found in the cavity of the cranium; of which the general capacity and particular forms depend entirely on the size and partial developement of the brain. Hence our zoological study of man will be greatly assisted by carefully examining genuine specimens of the skulls of different nations, which are easily prepared and preserved, may be conveniently handled and surveyed, considered in various points of view, and compared to each other.

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* *Political Essay.* v. 4. p. 142.

† Cook's *Voyage to the Pacific;* i. 380.

Such a comparison will show us that the form of the cranium differs no less than the color of the skin, or other characters; and that one kind of structure runs, by gentle and almost inobservable gradations, into another; yet that there is, on the whole, an undeniable, nay, a very remarkable constancy of character in the crania of different nations, contributing very essentially to national peculiarities of form, and corresponding exactly to the features which characterize such nations. Hence anatomists have attempted to lay down some scale of dimensions, to which the various forms of the skull might be referred, and by means of which they might be reduced into certain classes.

With the exception of a few desultory observations, which are scattered through the works of different writers, DAUBENTON's Paper, "*Sur la Différence du grand Trou Occipital dans l'Homme et dans les autres Animaux,*" in the *Memoirs of the Royal Academy*

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* I do not speak of the original formation, nor mean to assert that the particular forms of the soft parts depend on those of the bones, as their cause: for numerous phenomena rather tend to prove the reverse of that position, or that the soft parts influence the configuration of the bones. I only wish to point out the relation between them, and to state, that either being known, it will be easy to determine the other.

of Sciences for 1764, contains the first attempt at any general remarks on the subject; and this, indeed, is more important in pointing out the differences between the human structure and that of animals, than in defining the characters of the skull in the different races of mankind. CAMPER has attempted a more general view, by means of his facial line and angle already described (see Chap. IV.) But what he has said cannot be considered even as approximating to a systematic account of the national varieties of the skull. It is sufficiently obvious that his method is applicable to such varieties only as differ from each other in the size and prominence of the jaws; that it will not at all exhibit the characters of those which vary in the opposite way, viz. in the greater or less breadth of the face, while the upper, posterior, and lateral aspects of the cranium are entirely disregarded. It often happens, that crania of the most different nations, which differ toto cœlo from each other on the whole, have the same facial line; and, on the contrary, that skulls of the same nation, which agree in general character, differ very much in the direction of this line.* CAMPER could not, indeed, have fully explained this subject, because he had no sufficient collection of crania for the purpose. His dissertation contains an engraving of a skull, which he calls that of a Calmuck, and adduces as a representative of all the natives of Asia. The characters of this skull are completely Negro, and the very reverse of those which distinguish the Calmuck. Besides this, he brings forward one Negro skull: and these two are all that it contains, except European heads.

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* The crania of a Negro and of a Pole, represented in the *Decades of* BLUMENBACH (*Dec. altera*, tab. x. *Dec. tertia*, tab. xxii.), possess exactly the same facial line; yet the general character of the two skulls is most opposite, when we compare the narrow and keel-shaped Ethiopian to the broad, square form of the Lithuanian. There are, in the same work, two Negro crania of very different facial lines, which, when viewed in front, betray their Ethiopic origin most incontestably, by the same characters of a narrow and compressed cranium and arched forehead.

In short, this criterion of the facial line, which I have already shown to be quite insufficient as a key to the intellectual rank of animals, is equally, if not more unserviceable, in its application to the varieties of man.

We are indebted to Blumenbach for the completest body of information on this subject, which he has been enabled to illustrate most successfully by an unrivalled collection of the crania of different nations from all parts of the globe.

His admirable work on the varieties of the human species contains a short sketch of the various formations of the skull in different nations; but he has treated the subject at greater length and with more minute detail in his *Decades Craniorum*, where the crania themselves are represented of their natural size.

He states that, in the examination and classification of his immense collection, he finds it every day more and more difficult, amidst such numerous differences in the proportion and direction of various parts, all of which contribute more or less to the national character, to reduce these to the measurements or angles of any single scale. Since, however, in distinguishing the characters of the different crania, such a view will gain the preference to all others, as offers at one glance the most numerous and important points, and such as contribute especially to the comparison of national characteristics, he has found, by experience, that to be the best adapted to this purpose, which is obtained by placing the different crania, with the zygomas perpendicular, on a table in a row, and contemplating them from behind. When skulls are thus arranged, those circumstances which contribute most to the formation of the national character, viz. the direction of the jaws and cheek-bones, the breadth or narrowness of the head, the advancing or receding outline of the forehead, are all distinctly perceived at one view. This method of considering the bony head he calls *norma verticalis*. It is exhibited in the three figures of plate IV, where three heads are represented in this point of view, in order to illustrate the subject. The middle of the three, distinguished by the symmetry and beauty of all its parts, is that of a Georgian female: the two outer ones are examples of heads differing from this in the opposite extremes. That on the left, elongated in front, is the head of a Negress; the other, on the right, expanded laterally, and flattened in front, is the cranium of a Tungoose, from the north-east of Asia. The great expanse of the upper and anterior part of the cranium, hiding the face, characterizes the Georgian. In the Ethiopian, the narrow slanting forehead allows the face to come into view; the cheeks and jaws are compressed laterally, and elongated in front. In the Tungoose, on the contrary, the maxillary, malar, and nasal bones are widely expanded on either side; and the two latter are on the same horizontal level with the glabella;* the forehead being still low and slanting.

In the first, or white variety of man, to which BLUMENBACH has given the epithet *Caucasian*,—including the ancient and modern inhabitants of Europe, the western Asiatics, or those on this side of the Caspian Sea, the rivers Ob and Ganges, and the northern Africans; in a word, nearly all the inhabitants of the world as known to the ancients,—the skull presents the finest intellectual organization; proportions indicating the greatest predominance of the rational faculties over the instruments of sense and of the common animal wants. The upper and front parts of the skull are more developed than in any other variety; and their ample swell completely hides the face, when we survey the head according to the *norma verticalis*. The facial line must, therefore, be nearly vertical; and the facial angle nearly a right angle. The face is comparatively small, and its outlines rounded, without any thing harsh or unpleasantly prominent. The cheek-bones are small, and do not stand out, but descend in a nearly straight line from the external angular process of the frontal bone. The alveolar margin of the jaws is rounded; and the front teeth are perpendicular in both. The chin is full and prominent.

Since this conformation is exhibited in the various nations of Europe, its leading traits must be familiar. As a specimen, I have selected from the third decade of BLUMENBACH's work, the skull of a Georgian† woman, because it comes from a quarter near the supposed original seat of our race, and from a tribe celebrated for personal beauty. From the elegance and symmetry of its formation, it may be regarded as the model of a female head; and is certainly, far preferable, in this point of view, to that of

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* The space between the frontal sinuses.

† *Decas tertia*; No. xxi. the 1st Plate of this work is copied from the figure of BLUMENBACH.

The representations in the *Tabulæ Sceleti et Musculorum Hominis*, and in the *Tab. Ossium Humanorum* of ALBINUS, also exemplify the characters of this variety.

> "The bending statue which enchants the world."

Gall and Spurzheim judiciously observed, that the head of the Venus was too small for an intellectual being; and that the goddess of love was thus represented as an ideot. In this Georgian head, the physical and moral attributes are well combined; the personal charms, which enchant the senses, are joined to those rational endowments which command esteem and respect, and satisfy the judgment.

The form of this head is of such distinguished elegance, that it attracts the attention of all who visit the collection in which it is contained. The vertical and frontal regions form a large and smooth convexity, which is a little flattened at the temples: the forehead is high and broad, and carried forwards perpendicularly over the face. The cheek-bones are small, descending from the outer side of the orbit, and gently turned back. The superciliary ridges run together at the root of the nose, and are smoothly continued into the bridge of that organ, which forms an elegant and finely turned arch. The alveolar processes are softly rounded, and the chin is full and prominent. In the whole structure there is nothing rough or harsh; nothing disagreeably projecting. Hence it occupies a middle place between the two opposite extremes of the Mongolian variety, in which the face is flattened, and expanded laterally; and the Ethiopian, in which the forehead is contracted, and the jaws also are narrow and elongated anteriorly.

Blumenbach observes, that the form of this head corresponds exactly to that of the marble statue of a nymph in the collection of the late Mr. Townley, of which he possesses a plaster cast. It tends also to confirm the testimony of the numerous travellers who have unanimously concurred in extolling the beauty of the inhabitants of Georgia and the neighboring countries. The expressions of Chardin are so warm and animated, that I subjoin the original passage. "Le sang de Géorgie, est le plus beau de l'orient, et je puis dire du monde. Je n'ai pas remarqué un visage laid en ce païs-la, parmi l'un et l'autre sexe; mais j'y en ai vu d'angeliques. La nature y a répandu sur la plupart des femmes des graces qu'on ne voit point ailleurs. Je tiens pour impossible de les regarder sans les aimer. L'on ne peut peindre de plus charmans visages, ni de plus belles tailles, que celles des Géorgiennes."* The head of the Jewish girl engraved in plate VII. exemplifies equally well the Caucasian formation.

The characters above described belong to the following people, whether ancient or modern; viz. the Syrians and Assyrians, Chaldeans, Medes, Persians,† Jews,‡ Egyptians, Georgians, Circassians, Mingrelians, Armenians,|| Turks,§ Arabs, Afghans, Hindoos of high caste, Gipsies,¶ Tartars,** Moors, and Berbers in Africa, Guanches in the Canary Islands, Greeks, Romans,†† and all the Europeans except the Laplanders. The enumeration includes all the human races in which the intellectual endowments of man have shone forth in the greatest native vigor, have received the highest cultivation, and have produced the richest and most abundant fruits in philosophy, science and art, in religion and morals, in poetry, eloquence, and the fine arts, in civilization and government,—in all that can dignify and ennoble the species. We cannot, therefore, wonder that they should in all cases have not merely vanquished, but held in permanent subjection, all the other races.

Much uncertainty has prevailed respecting the physical characters of the ancient Egyptians; and some have maintained the opinion that they were negroes.‡‡ The question is certainly in-

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* *Voyages en Perse*; t. 1. p. 171. Edition of 1735.

† BLUMENBACH, *Dec.* No. xxxiv.

‡ Ibid. n. xxviii. & xxxv.

|| Ibid. xli.

§ Ibid. ii.

¶ A genuine Transylvanian Gipsey; ibid. xi.

** Ibid. xii. SANDIFORT, *Muséum Acad Lugduno-Bat.* v. 1. tab. ii.

†† Roman Prætorian soldier; ibid. xxii.

‡‡ VOLNEY seems to assume it as a settled point, that the ancient Egyptians were Negroes. "How are we astonished when we behold the present barbarism and ignorance of the Copts, descended from the profound genius of the Egyptians, and the brilliant imagination of the Greeks: when we reflect, that

teresting, particularly if it should appear that this opinion is well grounded. That a race ever devoted, within the period embraced by authentic history, to slavery, or to an independent existence not much better, and possessing, under the most favorable circumstances, only the rudiments of the common arts, and the most imperfect social institutions, should have accomplished in the remotest antiquity, undertakings which astonish us even now by their grandeur, and prove so great a progress in civilization and social life, in arts and sciences,—that they should have subsequently lost all traces of this surprising progress, and never have exhibited the smallest approximation to such a preeminence in any other instance,—would be a fact extremely difficult to explain.

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to the race of Negroes, at present our slaves, and the objects of our extreme contempt, we owe our arts, sciences, and the very use of speech ; and when we recollect, that in the midst of those nations who call themselves the friends of liberty and humanity, the most barbarous of slaveries is justified : and that it is even a problem, whether the understanding of Negroes be of the same species with that of white men !" *Travels in Syria and Egypt* ; chap. vi.

The researches of MEINERS into the ancient authorities lead to the conclusion that there was a great conformity, both in bodily formation and in customs and political institutions between the Egyptians and Indians (Hindoos ;) and a less marked affinity between the former and the Ethiopians. But it is not clear what race of men was meant by that term : for the ancient historians speak of Negro Ethiopians, of another African Ethiopian race with long hair, and of Asiatic Ethiopians. *De veterum Egyptiorum Origine* ; in *Commentation. Reg. Soc. Scient. Goetting* v. 10.

Dr. PRICHARD has broght together, with great learning and industry, all the ancient testimonies that can illustrate this question : and has examined and collated them so carefully, that nothing further can be expected from this quarter. The results are thus summed up : "We may consider the general result of the facts which we can collect concerning the physical characters of the Egyptians to be this. That the national configuration prevailing in the most ancient times was nearly the Negro form, with woolly hair ; but that in a later age this character had become considerably modified and changed, and that a part of the population of Egypt resembled the modern Hindoos. The general complexion was black, or at least a very dusky hue." *Researches into the Physical History of Man*, p. 388 In the seventh and eighth chapters of this work the most extensive and learned researches are employed to prove the affinity between the ancient Egyptians and Indians ; and to show that both were marked by the characters of the negro race.

Egypt was venerated, even by antiquity, as the birth place of the arts; and still retains innumerable monuments of their former splendor, after so many ages of desolation. Her principal temples, and the palaces of their kings, still subsist, although the least ancient of them were constructed before the war of Troy. With our present experience of the capacity of Negroes, and our knowledge of the state in which the whole race has remained for twenty centuries, can we deem it possible that they should have achieved such prodigies? that Homer, Lycurgus, Solon, Pythagoras, and Plato, should have resorted to Egypt to study the sciences, religion, and laws, discovered and framed by men with black skin, woolly hair, and slanting forehead?

The situation of Egypt favors the notion of a mixed population which may have flowed in at various times from different quarters of Africa, Asia, and Europe.

The Caucasian races of Arabia, Syria, and the surrounding parts must, have found their way into this fertile and flourishing country: the Red Sea offers an easy medium of communication both with Arabia and India; while the freest access exists on the south and west to the Negroes and Berbers of Africa. Hence specimens of various races may be naturally expected to occur among the mummies; and may have afforded models to the painter and sculptor. If, however, among the myriads of embalmed bodies, of the sculptured figures which cover the walls of temples and palaces, and of other works of art, we should meet with one or two of Negro formation, are we thence to conclude that the original Egyptians were Negroes; or that men of the latter race possessed those distinguished powers of knowled[illegible] and reflection, which the early history of this wonderful country compels us to assign to its ruling race? Ought we not rather to draw our conclusions from the most prevalent forms, those which are most numerous and abundant in the oldest specimens? If, among a profusion of mummies and figures, bearing the stamp of the Caucasian model, a few should occur with a little dash of the Negro character, may we not suppose the individuals who furnished the pattern of the latter to have been in Egypt, as they have been every where, slaves[*] to the race of more noble formation? To give the few negroes the glory of all the discoveries and achievements of this first-civilized race, and overlook the more numerous individuals of different character, would be in opposition to the invariable tenor of our experience respecting human nature.

In the course of his inquiries into the natural history of man, this subject attracted the attention of BLUMENBACH, who has been fortunate enough to procure the opportunity of examining several mummies. He gave an account of some of these in the *Philosophical Transactions* for 1794. Having afterwards met with another very perfect specimen, he published a more enlarged and detailed essay on the whole subject in his *Contributions to Natural History*, part ii. Goett. 12mo. 1811.

He expresses his surprise that professed and judicious antiquaries, such as WINKELMANN and D'HANCARVILLE, should have ascribed one common character of national physiognomy to the ancient Egyptian works of art, and should have despatched it, shortly and decisively, in two lines.

"I think," he continues, that we cannot fail to recognise at least three principal differences; which, indeed, like all varieties of formation in our species, run together by numerous gradations, yet are marked, in their strongest forms, by very distinct characters. They are, the Ethiopian, the Indian, and one resembling the Berbers or original inhabitants of the Barbary states.

"The first is marked by prominent jaws, thick lips, a broad flattened nose, and projecting eyes. Such, according to LEDYARD, VOLNEY, LARREY, and other competent authorities, are the characters of the modern Copts:[†] such, too, according to the best

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[*] Slavery is coeval with our earliest records. See *Genesis*, ix. 25 26: xii. 5.

[†] The Copts, who are regarded as the descendants of the ancient Egyptians, have "a yellowish dusky complexion. which is neither Grecian nor Arabian; they have all a puffed visage. swoln eyes, flat noses, and thick lips; in short, the exact countenance of a mulatto." VOLNEY, *Travels in Syria and Egypt*.

I do not, however, find the Negro character expressed in the delineations of Copts by DENON, *Voyage dans la Haute et Basse Egypte*; pl. 105. No. ii.: pl. 108. No. ii. and iii.; nor in those of the great *Déscription de l'Egypte*: see *Etat Moderne*, vol. ii. *Costumes and Portraits*. Neither have I succeeded in descriptions and delineations in **Norden**, **Volney**, **Denon**, and others, is the countenance of the great sphinx at Gizeh, and of many other ancient works of Egyptian art. The Egyptians themselves, according to the well-known passage of **Herodotus**,[*] had these characters: and **Lucian**[†] gives a similar description of a young Egyptian at Rome.[‡]

"Ethiopian form must be here understood in that wide acceptation which we give to the expression 'Ethiopian race,' in the arrangement of the human species; and not in the more marked but narrower sense of what the English call the true Guinea face. Indeed, the physiological characters of the Negro, taken in a general sense, are as loosely defined as his geographical description; for, among Negroes, there are several who, in smoothness of the hair and general beauty of form, excel many Europeans.

"A complete contrast to this Ethiopion form is presented in the Hindoo-like character of other old remains, which consists of a long slender nose, long and narrow aperture of the eyelids running upwards to the temple, ears placed high on the head, short and slender trunk, and long legs.[||] The female figure on the back of Capt. **Lethieullier's** mummy in the British Museum, is a characteristic representation of this form, and accords entirely with the well-known national make of the Hindoos.

"A very competent judge, the learned P. a S. **Bartholomæo**, after carefully comparing together the various Egyptian works of art in the rich Italian collections, not only fully admits the justice

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discovering representations of Negroes among the almost numberless sculptures of the ancient buildings represented in both these works. The human figures are marked by traits of a form altogether different.

[*] He argues that the Colchians must have been a colony of Egyptians, because they were "*melangchroes kai oulotrikes*"—black-skinned and woolly-haired. Lib. ii.

[†] *Navigium, S. Vota*; c. 2.

[‡] **Blumenbach** refers, in a note, to two figures with marked Negro form: one is engraved as a vignette to the Preface of his *Contributions*, part ii.; and the other is described by P. a S. **Bartholomæo**, in his *Mumiographia Obiciana*, p. 51.

[||] Such a head is represented in the title-page vignette.

of my threefold division, but particularly confirms the strong contrast between the Ethiopian formation and that Hindoo character so well known to him from his long residence in Hindostan.*

In accordance with this distinction, long smooth hair has been found in some mummies, and short curled hair in others.†

"The third and commonest kind of form resembles neither of the foregoing, and is characterized by a peculiar bloated habit, swoln and rather loose cheeks, short chin, large projecting eyes, and fleshy body. (See the vignette at the end of the Preface.) I call this the Berber character, because the great analogies which constitute the surest basis for conclusions respecting the descent and affinities of people, viz. those of form, language, and agreement in customs of marked peculiarity, are here all united."‡

I proceed to an osteological examination of the mummy heads; which, if performed with accuracy and discrimination, will supply us with sure data, as far as they go. We shall find that the bodies thus preserved, have the characters of the Caucasian variety; and we shall hardly discover, among a great multitude of examples, a single unequivocal instance of Negro formation.

In his *Decades Craniorum*, No. I. and XXXI., BLUMENBACH has represented two Egyptian skulls. The first bears no marks of Ethiopian origin, nor does the author assign to it any such characters. "In universum hujus cranii habitus eundem characterem præ se ferre videtur, quem et ingentia Ægyptiacæ artis veteris opera spirant, non quidem elegantem et pulchellum, est magnum" p. 13.

The European or Caucasian character of the second is quite obvious; yet, in the description, there appears a desire of fixing on it some mark of Negro descent. "Quod vero universum vultum attinet, differt quidem ille satis luculenter a genuino isto Nigritarum, qui Anglis vulgo facies Guineensis audit; *Æthiopici tamen aliquid spirat*, ita ut propius absit ab Habessinico, qualem curata icon exhibet, proxime autem ab eo, quem tot antiquissima Ægyptiacæ artis monumenta præ se ferunt." The Abyssinians to whom a comparison is here made, are of Arab descent, and have all the characters of the Caucasian variety.

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* "Stat ergo ea veritas, præter Æthiopicum vultum in Egypto, ejusque mumiis et monumentis, admittendum esse characterem quendam Indicum, qui Egyptiis non minus gentilitius et nativus est quam Æthiopicus

† For this fact GRYPHIUS is quoted.

‡ P. 130—137.

Soemmerring describes the heads of four mummies which he has seen: two of them different in no respects from the European formation; the third had the African character of a large space marked out for the temporal muscle; no other proof of Negro descent is mentioned; and what is stated concerning the face, rather contradicts the supposition: the characters of the fourth are not particularized.

"Caput mumiæ, quod Cassellis in museo servatur, nil fere ab Europæo differt.*

"Caput etiam mumiæ in theatro anatomico Marpurgensi servatum, cujus exacta delineatio ad manus est, nil a capite Europæo deflectit.

"Pulcherrima et optime servàta, forsan virilis mumiæ calvaria optimæ ætatis, qua me Mieg, Professor Basileensis benevole donavit, quæque olim in collectione F. Plateri fuit, distincte formam Africanam, *alte progrediente vestigio insitionis musculi temporalis*, repræsentat; vertex non est compressus, *neque ossa faciei robustiora sunt ossibus Europæorum*. Densum ordinem integri pulchri dentes sistunt, non nisi inferiores incisores et canini oblique priora et inferiora versus attenuati sunt, plurimum vero medium incisorum par, brevioribus ea de causa coronis instructum.

"Calvaria mumiæ hominis senis confecti, ab eodem Mieg mihi data, Ægyptiacam ossium faciei formam minus accurate repræsentat, verum dentes incisores exteriores inferiores, et dentes canini modo quem suprà indicavi, se habent; distant nimirum inter se, et in planum sunt attenuati.†"

Denon states, of the female mummies, "que leurs cheveux étoient longs et lisses; que le caractère de la tête de la plupart tenoit du beau style. Je rapportois une tête de vieille femme, qui étoit aussi belle que celles des Sibylles de Michael Ange."‡

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* Bruckmann's *Nachricht von einer Mumie;* Brunswick, 1782. 4to.

† *De Corporis Humani Fabrica;* t. i. p. 70, 71.

‡ *Voyage*, p. 252.

The embalmed heads from the catacombs of Thebes (Qurnah) engraved in the great French work, are of the finest European form, to which their abundant, long, and slightly-flowing hair fully corresponds. There is a male head, with the broad and fully-developed forehead, small perpendicular face, and all the contours of our best models.* "L'angle facial se rapproche beaucoup d'un angle droit; et les dents incisives sont plantées verticalement, et non inclinées ni avancées, comme elles le seroient dans une tête de Négre." The nose is finely arched; the jaws perpendicular; the mouth and chin well formed. The front and profile views of a female head† are of the same character; the face completely European, the hair copious, and disposed in small masses or locks, a little turned. The same remarks are applicable to another head,‡ of which a section is also exhibited.

The skulls of four mummies in the possession of Dr. LEACH of the British Museum, and casts of three others, agree with those just mentioned in exhibiting a formation not differing from the European, without any trait of Negro character.

Lastly, so far as osteological proofs go, the question may be considered as completely decided by the strong evidence of CUVIER.

It is now clearly proved,—yet it is necessary to repeat the truth, because the contrary error is still found in the newest works,—that neither the Gallas (who border on Abyssinia,) near the Bosjesmen, nor any race of Negroes, produced that celebrated people who gave birth to the civilization of ancient Egypt, and from whom we may say that the whole world has inherited the principles of its laws, sciences, and perhaps also religion.

"BRUCE even imagines that the ancient Egyptians were Cushites, or woolly-haired Negroes: he supposes them to have been allied to the Shangallas of Abyssinia.

"Now that we can distinguish the several human races by the bones of the head, and that we possess so many of the ancient Egyptian embalmed bodies, it is easy to prove that, whatever may have been the hue of their skin, they belonged to the same race with ourselves; that their cranium and brain were equally voluminous; in a word, that they formed no exception to that cruel law, which seems to have doomed to eternal inferiority all the tribes of our species which are unfortunate enough to have a depressed and compressed cranium.

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* *Description de l'Egypte: Antiquities*, t. ii. pl. 49.

† Ibid. pl. 50.

‡ Ibid. pl. 51.

"I present the head of a mummy, that the Academy may compare it to those of Europeans, Negroes, and Hottentots. It is detached from an entire skeleton, which I did not bring on account of its brittleness; but its comparison has furnished the same results. I have examined, in Paris, and in the various collections of Europe, more than fifty heads of mummies, and not one amongst them presented the characters of the Negro or Hottentot."*

By examination of the bony head, we learn that the Guanches also, or the race which occupied the Canary Islands, at the time of their first discovery by the Europeans in the fourteenth century, belonged to the Caucasian variety. The name Guanches signifies 'men' or 'sons,' in their language. The Spaniards, who conquered them, represent them as a people of strength and courage, of powerful bodies and intelligent minds, advanced in social institutions, and of pure morals. They made the bravest resistance to their European invaders, who did not completely subject them until after a hundred and fifty years of repeated contest. They had a tradition of their descent from an ancient, great and powerful people.

We now know them, as we do the Egyptians, only by their mummies,† the race being completely extinct. The entire head, engraved in Blumenbach's fifth decade,* offers no essential difference from the European form.

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* *Extrait d'Observations faites sur le Cadavre d'une Femme connue à Paris et à Londres sous le nom de Vénus Hottentotte. Mémoires du Muséum d'Hist. Nat.* t. 3. p. 173, 174.

† The body of which BLUMENBACH'S engraving exhibits a head, appears to him to be that of a female. "When brought from its subterranean abode on the island of Teneriffe to London, it was entirely and curiously sewed up in goat-skins, according to the usual practice of this ancient aboriginal race. (See

The testimony of Cuvier is to the same effect. "I present to the Academy the head of a Guanche; a specimen of that race which inhabited the Canaries before they were conquered by the Spaniards. Some authors, believing the tales of Timæus concerning the Atlantis, have regarded the Guanches as the wreck of the supposed Atlantic people. Their practice of preserving dead bodies in the mummy form might rather lead us to suspect some affinity to the ancient Egyptians.† However that may be, their head, like that of the Egyptian mummies, demonstrates their Caucasian origin."‡

The latter point is fully confirmed by two Guanche skulls in the possession of Dr. Leach.

The form of the cranium has not yet been sufficiently studied and observed to enable us to say that the several very different nations included under the Caucasian variety are or are not characterized by particular modifications of this cavity. There are, however, some peculiarities so striking, that they immediately at-

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Viera *Noticias de las Islas de Canaria*; Glas's *History of the Canary Islands*; Golberry *Voyage en Afrique*; i. p. 83—95.) It was surprisingly dry, and perfectly inodorous, although the muscles and skin, the contents of the head, thorax, and abdomen, in short, all the soft parts, had been preserved. So powerful had the process of exsiccation been, that the entire body weighed only seven pounds and a half; although a female skeleton of the same stature, in its ordinary state of dryness, would weigh at least nine pounds." *Dec.* 5, p. 7.

* No. xlii.

† Although the Guanches were separated from the Egyptians by the entire breadth of northern Africa, they not only resembled them in the singular practice of preserving the dead, which was entrusted in both cases to the priests, and in some of the ornaments bestowed on the mummies, but also in language. From a vocabulary of the Tuariks, near Egypt, collected by Hornemann, Mr. Marsden traced an affinity between them and the Berbers or Numidians, with whose language it is well known that the small remains of the Guanche tongue agree.—Blumenbach, loc. cit. p. 8. Adelung, *Mithridates*; vol iii. part 1. page 58, 60.

‡ Cuvier, *loc. cit.* Soemmerring mentions that the head of a Guanche mummy at Cassel has the Negro characters; but enters into no further detail. *De Corp. Humani Fabric.* t. 1. p. 71.

tract notice. The completely globular form of the skull in the Turk is one of these; it is exemplified in an engraving of Blumenbach's first decade,* corresponding exactly to a skull which I have seen. The cranium (properly so called) is perfectly globular; the occiput can be hardly said to exist, as the foramen magnum is placed very near the posterior part of. the basis cranii; the forehead is broad, and the glabella prominent. The posterior part of the head is very high and broad. The proportions of the face are symmetrical and elegant. The alveolar part of the upper jaw-bone is singularly short; not measuring more than the breadth of the little finger under the nose. The basis of the lower jaw is remarkable for its shortness; the facial line nearly vertical, so that the preponderance of the parts placed in front of the occipito-atloidal articulation is reduced as much as possible.

Two other Turkish skulls in Blumenbach's possession have exactly the same shape: which is very general in living Turks, and is always visible in good portraits of them. This peculiarity of form has been observed by several authors: it is indeed so striking, that it could hardly have escaped observation. "It appears," says Vesalius, that most nations have something peculiar in the form of the head. The crania of the Genoese, and, still more remarkably, those of the Greeks and Turks, are completely globular in their form. This shape, which they esteem elegant, and well adapted to their practice of enveloping the head in the folds of their turbans, is often produced by the midwives at the soliciation of the mothers."†

A corresponding statement to this account is given by Baron Asch, in a Letter to Blumenbach. He says, that the midwives at Constantinople commonly inquire of the mother, after parturition, what form she would like to have given to the head of the child; and that they generally prefer that which results from a tight circular bandage, as they think that their turbans sit better when the head has that round shape.‡

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* No. ii.

† *De Corporis Humani Fabrica*; p. 23, ed. of 1555.

‡ Blumenbach, *Dec*. i. p. 16.

That the old women should have told such a story, and that the Baron should have believed them, is not surprising; but it seems to me very extraordinary that a physiologist, and one well acquainted with nature, should have given credit to this old-wife's tale. A single glance at his own engraving of this beautiful head, at the symmetrical and elegant formation of the whole fabric, the nice correspondence and adjustment of all parts, the perfect harmony between the cranium and face, and in all the details of each, demonstrate most unequivocally that it is a natural formation, and a very fine work of nature too, There is not the minutest vestige of artificial impression: and I can have no hesitation in asserting the impossibility of inducing by bandage, pressure, or artifice of any kind, such a form on a head of a different original configuration.

In the passage already quoted, VESALIUS goes on to observe, "that the Germans had generally a flattened occiput and broad head, because the children are always laid on their backs in the cradles; and that the Belgians have a more oblong form, because the children are allowed to sleep on their sides." These practices account just as well for the German and Belgian forms, as the manœuvres of the Constantinople midwives do for the spherical skulls of the Turks. I have, however, seen German heads of a globular form; remarkably high and broad behind; resembling the Turkish cranium in this respect, and in the approximation of the great occipital foramen to the posterior part of the basis cranii.

SOEMMERRING says that he finds no well-marked differences between the German, Swiss, French,* Swedish,† and Russian‡ skulls in his collection; except that the orbits are contracted in the Russian, their margins quadrangular, and the teeth small. In the skull of a Pole, figured by BLUMENBACH,‖ the smallness of the orbits is a remarkable feature.

That no striking difference has been discovered on comparing together one or two casual specimens of each of the nations above mentioned, does not authorize us to conclude that no differences exist. On the contrary, if the brain be the seat of our intellectual and moral functions, which nobody at present seems to doubt; and if the several propensities, sentiments, and intellectual powers, are the functions of certain parts of this organ, which is at least a probable doctrine; we shall be much surprised to find that no distinctions are observable in the shape of the cranium between English, French, Germans, Italians, &c. The only mode of ascertaining the point satisfactorily, would be to collect a considerable number of heads of each nation, or of accurate casts or portraits; and to select, for this purpose, individuals of genuine descent whose organization has not been modified by foreign intermixture. My friend, Mr. GEORGE LEWIS, whose quickness in distinguishing forms, and readiness and accuracy in portraying them to the very life, are well known, observed in a tour through France and Germany, that the lower and anterior part of the cranium is larger in the French, the upper and anterior in the Germans; and that the upper and posterior region is larger in the former than in the latter. He was also struck with the very fine forms of the skull in Italians, which coincides completely with what I have seen of them in this country. Our decision, then, on this very interesting subject must be postponed at present, and await the result of more numerous and accurate comparisons.

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* SANDIFORT *Museum Acad. Lugd. Bat.* v. 1. tab. 6.

† Ibid. tab. 4.

‡ Ibid. t. 9.

‖ *Decad.* iii. No. 22.

Into minuter differences, such as the high cheek-bones of the Scotch, the aquiline noses of the Jews and Armenians, &c. I do not propose to enter.

In the four following varieties of the human race we observe, on comparing them to the Caucasian, a much less perfect developement of the upper and anterior parts of the cranium, and very often a greater size of the face. This and similar observations are to be taken in a general sense; individual modifications are numerous in all the varieties, so that both the Caucasian and the dark-colored divisions furnish examples of individuals, which exhibit, in each case respectively, the characters of the other; yet, in many of the dark races, a low, narrow, and retreating forehead is a very striking and general character.

The second, or Mongolian variety, includes those Asiatics which do not come under the first division, and the inhabitants of the northern parts of America and Europe. The forehead is low and slanting, and the head altogether of a square form. The cheek-bones stand out widely on either side. The glabella and ossa nasi, which are flat and very small, are placed nearly on the same plane with the malar bones. There are scarcely any superciliary ridges. The entrance of the nose is narrow; the malar fossa forms but a slight excavation. The alveolar edge of the jaws is obtusely arched in front; the chin rather prominent. This formation is most strikingly exhibited in the Mongolian tribes, which are widely scattered over the continent of Asia, and which have generally, but erroneously, been included, with others of different origin and formation, under the name of Tartars (Tatars;) whereas the last-mentioned tribes, properly so called, belong to the first division of the human race. The Calmuck and other Mongolian nations which overran the Saracen empire under Zenghis Khan, in the thirteenth century, and had entered Europe, are described in the *Historia Major*[*] of MATTHEW PARIS, under the

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[*] London, 1686: fol. p. 530. The description is contained in a letter sent by an ecclesiastic from Vienna, in 1243, to his Archibishop in France, and speaks "de horribili vastatione inhumanæ gentis, quam Tartaros vocant." These barbarous hordes had at that time entered Hungary, and penetrated even to Vienna. His description of their corporal characters corresponds to the portrait which, from BUFFON downwards, so many naturalists have drawn of the Mongolian tribes, under the name of Tartars:

"Habent autem Tartari pectora dura et robusta facies macras et pallidas, scapulas rigidas et erectas, nasos distortos et breves, menta proeminentia et acuta, superiorem mandibulam humilem et profundam, dentes longos et raros, palpebras a crinibus usque ad nasum protensas, oculos inconstantes et nigros, aspectus obliquos et torvos, extremitates ossosas et nervosas, crura quoque grossa, sed tibias breviores, statura tamen nobis æquales; quod enim in tibiis deficit, in superiori corpore compensatur."

BLUMENBACH, from whose *Second Decade*, p. 7, I have borrowed this quotation, observes, "that the writer obviously speaks, not of the genuine Tartars, but of a people most widely different from them, namely, the Mongols or Calmucks, whose only affinity to them consisted in the name by which then and even now, the two races are improperly confounded. All the characters, therefore, which naturalists have assigned to the Tartars, belong to the totally-different Mongolian race. We know, on the contrary, that the Tartars are a hand-name of *Tartars;* whereas that appellation, or rather Tatars, properly belongs to the western Asiatics, who had been vanquished by the Mongols. The error, however, arising from this source has been propagated down to the present day; so that in the works of the most approved naturalists, as BUFFON and ERXLEBEN, we find the characters of the Mongolian race ascribed to what they call the Tartars. The mistake has not been detected, even by the most celebrated and classical modern historians: for Dr. ROBERTSON* speaks of Zenghis as the Emperor of the Tartars.

For the illustration of this variety I have selected from BLUMENBACH's work, *(Dec. alter.;* No. 14) the engraving of a Calmuck's skull, see Plate III.: and that of a Burat child, Plate VII. The cranium is nearly globular; the face broad and flattened; the forehead flat and wide; the malar bones standing out laterally; the orbits very large and open; the superciliary arches elevated; the general habit of the skull in a manner swoln, (quasi inflatus et tumidus.)

" The whole character of this skull corresponds to the well-known Calmuck countenance, and agrees perfectly with the engraving of a Calmuck skull published by J. B. DE FISCHER;† but nothing can be more different from it than the figure‡ in CAMPER's posthumous work on the facial line, which he brings forward as a representation of a head of the same race, and considers as a type of the formation prevailing over all Asia, North America, and the numerous islands of the Pacific Ocean. Without noticing the latter opinion, which is contradicted by the slightest ac-

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some people, conspicuous for the beauty and symmetry of their countenance, as is evinced in the skull here represented (No. 7,) which presents a complete contrast to the Mongolian characters of several specimens in this collection."

Further information on the origin of this confusion of names may be procured from J. E. FISCHER *Conjectura de Gente et Nomine Tatarorum,* in his *Quæstiones Petropolitanæ;* also from his *Sibirische Geschichte,* t. 1.

[*] " History of America;" v. I. p. 45.

[‡] ' Dissertatio Osteologica de Modo quo Ossa se vicinis accommodant Partibus." Lugd. Bat. 1743. 4to. tab. 1.

[†] " Traité Physique des Différences réelles," &c. tab. 1. fig. 4.: tab. iii. fig. 3.

quaintance with the native inhabitants of these various regions, I shall merely observe, that I am well convinced that the skull in question belongs to that variety of the human race which is the most widely different from the Calmuck, viz. to the Negro. Although no national form is so constant as not to be exposed to many deviations, and hence we meet among Europeans with individuals approaching to the Negro or Mongol characters, yet the form of the Calmuck head is so completely contrary to that of the Negro, and the figure in question bears so genuine and unequivocal an Ethiopian character, that I am convinced the excellent author must have been deceived, and consequently that his work, besides European, contains only two African skulls."[*]

The head of Yakut,[†] from the remotest parts of Siberia, exhibits the same characters. A square face; large orbits, separated by a very considerable ethmoid bone; the nasal bones small and running together above into a point.

This is followed by the skull of a Tungoose,[‡] of that description which are called Rein-deer Tungooses. The face is flattened, and of great breadth across the cheeks; the forehead depressed; the olfactory apparatus very considerable.

The decades of BLUMENBACH contain also figures of another Calmuck[||] of a Burat child[§] a year and a half old, of a Don Cossack,[¶] a Durian or Chinese Tungoose,[**] and an ancient inhabitant of southern Siberia;[††] all exemplifying, in a more or less marked manner, the characters of the Mongolian variety.[‡‡]

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[*] "Dec. alt." p. 9, 10. [†] Ibid. tab. 15. [‡] Ibid. tab. 16.

[||] Tab. 5. [§] T. 29. [¶] T. 4. [**] T. 23.

[††] T. 33. This skull was taken from one of the very ancient burial-places which are found near the workings of old mines in the mountainous parts of Siberia, and are ascribed by the natives to Tschudæ or barbarians. They are particularly described by PALLAS, "Reise durch verschiedene Provinzen des Russischen Reichs;" t. 3. p. 608 et seq. Neither history nor tradition has preserved any memorials of the people whose remains and works are found in these situations. The lightness of the skull, from the entire loss of the animal substance, corresponds with this fact in proving the high antiquity of this race; and its physical characters accord with those of the tribes who now occupy the the same regions.

[‡‡] A Calmuck skull of very characteristic form is represented in E. SANDIFORT "Museum Academicum Lugd. Bat." v. 1. tab. 1.

The same characters are strongly expressed in the skull of a Lapland female,[*] and prove unequivocally that this race belongs to the Mongolian variety.

The third or Ethiopian variety comprehends all the Africans which are not included within the first or Caucasian division; all of whom partake, more or less, of the well-known Negro form.

The front of the head, including the forehead and face, is compressed laterally, and considerably elongated towards the front; hence the length of the whole skull, from the teeth to the occiput, is considerable. It forms, in this respect, the strongest contrast to that globular shape which some of the Caucasian races present, and which is very remarkable in the Turk.

The capacity of the cranium is reduced, particularly in its front part, where it appears as if the forehead had been sliced off. The face, on the contrary, is enlarged.

"I measured," says **Soemmerring**, "several Negro, and nearly all my European crania, in order to compare the capacity of the respective cerebral cavities. I found in the former, 1st, that the measure taken by carrying a string from the root of the nose, along the middle of the forehead and the sagittal suture, to the posterior edge of the foramen ovale, the length of the face being equal, was much shorter. 2dly, That the horizontal circumference, measured by a string carried round the head above the eyebrows and the superior edge of the temporal bone, was much less. 3dly, That neither the long diameter from the forehead to the occiput, nor any transverse diameter between the parietal or the temporal bones, is equal to the corresponding one in the European."[†]

The frontal bone is shorter, and, as well as the parietal, less excavated and less capacious than in the European; the temporal ridge mounts higher; and the space which it includes is much more considerable. The front of the skull seems compressed into a narrow keel-like form between the two powerful temporal muscles, which rise nearly to the highest part of the head: and has a compressed figure, which is not equally marked in the entire head, on account of the thickness of the muscles. Instead of the ample swell of the forehead and vertex, which rises between and completely surmounts the comparatively weak temporal muscles of the European, we often see only a small space left between the two temporal ridges in the Ethiopian.

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[*] "Dec. quinta"; tab. 43.

[†] "Ueber die körperliche Verschiedenheit des Negers vom Europäer;" § 50.

The foramen magnum is larger, and lies farther back in the head: the other openings for the passage of the nerves are larger.

The bony substance is denser and harder; the sides of the skull thicker, and the whole weight consequently more considerable.

The bony apparatus employed in mastication, and in forming receptacles for the organs of sense, is larger, stronger, and more advantageously constructed for powerful effect, than in the races where more extensive use of experience and reason, and greater civilization, supply the place of animal strength.

If the bones of the face in the Negro were taken as a basis, and a cranium were added to them of the same relative magnitude which it possesses in the European, a receptacle for the brain would be required much larger than in the latter case. However, we find it considerably smaller. Thus the intellectual part is lessened; the animal organs are enlarged; proportions are produced just opposite to those which are found in the Grecian ideal model. The facial angle of the skull of a Negro, which is engraved in Plate III. is 65°. The narrow, low, and slanting forehead, and the elongation of the jaws into a kind of muzzle, give to this head an animal character which cannot escape the most cursory examination.

A similar head with a similar facial angle, has been figured by Ed. Sandifort.* It is sufficiently obvious, that on a vertical antero-posterior section of the head, the area of the face will be more considerable in proportion to that of the cranium, in such a skull, than in the fine European forms.

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* "Museum Acad. Lugd. Bat." T. 1. tab. 3.

The larger and stronger jaws require more powerful muscles. The temporal fossa is much larger; the ridge which bounds it rises higher on the skull, and is more strongly marked, than in the European. The thickness of the muscular mass may be estimated from the bony arch, within which it descends to the lower jaw. The zygoma is larger, stronger, and more capacious in the Negro; the cheek bones project remarkably, and are very strong, broad, and thick: hence they afford space for the attachment of powerful masseters.

The orbits, and particularly their external apertures, are capacious.

Both entrances to the nose are more ample, the cavity itself considerably more capacious, the plates and windings of the ethmoid bone more complicated, the cribriform lamella more extensive, than in the European. The ossa nasi are flat and short, instead of forming the bridge-like convexity which we see in the European. They run together above into an acute angle, which makes them considerably resemble the single triangular nasal bone of the monkey. In the Negro skull, engraved in Plate III. before referred to, they are nearly consolidated together in their whole length.

The superior maxillary bone is remarkably prolonged in front; its alveolar portion and the included incisor teeth are oblique, instead of being perpendicular, as in the European. The nasal spine at the entrance of the nose is either inconsiderable or entirely deficient. The palatine arch is longer and more elliptical. The alveolar edge of the lower jaw stands forward, like that of the upper; and this part in both is narrow, elongated, and elliptical. The chin, instead of projecting equally with the teeth, as it does in the European, recedes considerably, like that of the monkey.

The preceding description of the Negro cranium must be taken in a general sense, with an allowance for exceptions and individual modifications: it is drawn from strongly-marked examples, and cannot therefore be received as universally and strictly applicable. We seldom meet with instances in which the animal character is so strongly portrayed as in this subject. The depression, narrowness, and flatness of the forehead, the great size and projection of the jaws, are carried here to an extraordinary and very striking degree. Travellers inform us that several Africans differ from the European formation in little more than color; so that the peculiar construction of the head, on the faith of which some would class these people as a distinct species, is by no means a constant character.

This diversity of form is abundantly proved by delineations of Africans executed by the best artists; and is well illustrated by the engravings which BLUMENBACH has published of six African heads,* all differing from each other, and exhibiting as much variety as we see in Europeans. They vary considerably in the developement and prominence of the forehead, in the size and arching of the nasal bones, in the projection of the jaws and teeth, the formation of the chin, and in other points; and fully justify his conclusion, "genuinos Æthiopes, si craniorum formam spectes, non minus certe, imo vero magis passim inter seipsos ab invicem differre, quam, nonnulli eorum a multorum Europæorum capitis forma differunt."†

The tribes in the south of Africa, that is, near the European colony at the Cape—the Hottentotts, Kaffers, Bosjesmen, &c. are not yet enough known to enable us to decide whether they ought to be arranged under the Ethiopian variety, or whether they belong to a different type. BLUMENBACH has figured and described a skull in his last decade;‡ and, more recently, CUVIER has published an account of a female head. In some points these two specimens differ from each other remarkably.

In the male Bosjesman's head represented by BLUMENBACH the cranium is less compressed than in the Negro. The orbits and cheek-bones are wide, the jaws not at all prominent, the incisor teeth with their alveoli and chin in the same perpendicular line. The latter is remarkably narrow and sharp. The nasal bones are very small, and nearly in the same plane with the nasal processes of the superior maxillæ.

"The bony head of our female Bosjesman," says CUVIER, "presented a striking combination of the traits of the Negro with those of the Calmuck. In the Negro, the mouth is prominent, the face and cranium compressed laterally: in the Calmuck, the jaws are flattened, and the face wide. In both, the bones of the nose are smaller and flatter than in the European. Our Bosjesman had the jaws more projecting than the Negro, the face wider than the Calmuck, and the nose flatter than either. In the latter respect particularly, her head came nearer to that of the monkey, than any I ever saw. From these general arrangements many particular traits of structure result: the orbits are very wide in proportion to their height; the entrance of the nostrils has a peculiar form; the palate has a larger surface; the incisor teeth are more oblique; the temporal fossa more extensive; &c.

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* *Dec. prima*; tab. 6, 7, 8. *Dec. altera*; tab. 17, 18, 19.

† *Dec. altera*; p. 13.

‡ *Dec. quinta*; tab. 45.

"I also find that the occipital foramen is proportionally larger than in other heads; which, according to the views of SOEMMERRING, would indicate an inferior nature"*

The characters of the Ethiopian variety, as observed in the genuine Negro tribes, may be thus summed up; 1. Narrow and depressed forehead; the entire cranium contracted anteriorly; the cavity less, both in its circumference and transverse measurements. 2. Occipital foramen and condyles placed farther back. 3. Large space for the temporal muscles. 4. Great developement of the face. 5. Prominence of the jaws altogether, and particularly of their alveolar margins and teeth; consequent obliquity of the facial line. 6. Superior incisors slanting. 7. Chin receding. 8. Very large and strong zygomatic arch projecting towards the front. 9. Large nasal cavity. 10. Small and flattened ossa nasi, sometimes consolidated, and running into a point above.

In all the particulars just enumerated, the Negro structure approximates unequivocally to that of the monkey. It not only differs from the Caucasian model; but is distinguished from it in two respects; the intellectual characters are reduced, the animal features enlarged and exaggerated. In such a skull as that represented in Plate III. selected because it is one which is strongly characterized, no person, however little conversant with natural history or physiology, could fail to recognise a decided approach to the animal form. This inferiority of organization is attended with corresponding inferiority of faculties; which may be proved, not so much by the unfortunate beings who are degraded by slavery, as by every fact in the past history and present condition of Africa.

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* "Extrait d'Observations sur la Venus Hottentotte: Mém. du Muséum," p. 270, 271.

I state these plain results of observation and experience without any fear that you will find in them either apology or excuse for Negro slavery. In the warm and long disputes on this subject, both parties have contrived to be in the wrong in the question regarding the Negro faculties. The abolitionists have erred in denying a natural inferiority so clearly evinced by the concurring evidences of anatomical structure and experience. But it was only an error of fact; and may be the more readily excused, as it was on the side of humanity.

Their opponents have committed the more serious moral mistake of perverting what should constitute a claim to kindness and indulgence into justification or palliation of the revolting and anti-christian practice of traffic in human flesh; a practice branded with the double curse of equal degradation to the oppressor and the oppressed. This very argument, which has been used for defence, seems to me a tenfold aggravation of the enormity. Superior endowments, higher intellect, greater capacity for knowledge, arts, and science, should be employed to extend the blessings of civilization, and multiply the enjoyments of social life; not as a means of oppressing the weak and ignorant, of plunging those who are naturally low in the intellectual scale still more deeply into the abyss of barbarism.

When we see a strong and well-armed person attack one equally powerful and well-prepared, we are indifferent as to the issue; or we may look on with that interest which the qualities called forth by the contest are calculated to inspire. But if the strong attack the weak; if the well-armed assail the defenceless; if the ingenuity, knowledge, and skill, the superior arts and arms of civilized life, are combined to rob the poor savage of his only valuable property, personal liberty; we turn from the scene with indignation and abhorrence.

They who possess higher gifts should remember the condition under which they are enjoyed: "From him to whom much is given, much will be expected." What a commentary on this text is furnished by Negro slavery, as carried on and permitted by religious nations, by Christian kings, Catholic majesty's, defenders of the faith, &c.!

In the two following varieties, the figure of the skull is not, so strongly characterized as in the three which have been already considered. They form, indeed, two intermediate gradations between the European and Mongolian on one side, and the African on the other.

The fourth, or American, variety includes all the Americans, excepting the inhabitants of the northern parts of the continent, which I have placed in the Mongolian division.

In this variety the cheeks are broad, but the malar bones are more rounded and arched than in the Mongolian; and not expanded to such an extent on either side, nor possessing such an angular form. The forehead is small and low; the orbits deep; and the nasal cavity, in many cases at least, very large. The entire bony apparatus of the face is in general much developed.

BLUMENBACH has published several specimens, in which the characters just enumerated are exemplified. Tab. 9. is the head of a North-American savage executed for murder at Philadelphia. It is remarkable for the flatness and depression of the vertex, the developement of the region above the ear, and the great size of the olfactory apparatus. BLUMENBACH considers that the latter circumstance explains the anecdotes related by travellers of their extraordinary acuteness in the sense of smelling.

The form of this skull entirely agrees with engraved portraits of eight Cherokee Indians,* all of whom have prominent cheeks, and the upper part of the skull depressed.

The head of an American from an Indian burial-place on the eastern bank of the Mississippi, about 40° north latitude, Tab. 38, presents a conformation approaching more to the Caucasian than to the Mongolian. In a race, of which the characters are intermediate between two others, we may reasonably expect that some individuals will approximate to one, and some to the other variety.

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* There is an engraving, by BASIRE, of seven; Lond. 1730. THAYENDANEEGA, a chief of the Six Nations is represented in an engraving by SMITH from a painting by ROMNEY, 1779.

The Eskimaux* and the Greenlanders† form a transition from the American to the Mongolian variety; they have broad cheek-bones, large jaws and face, and small flattened nose. The size of the head altogether and particularly the cranium, is larger in the latter than in the former. The figures of BLUMENBACH correspond to the best descriptions of these people, in which the largeness of their heads is noticed.

The head of an ancient Aturian, brought by HUMBOLDT,‡ from the subterraneous excavations in the granite rocks at the cataracts of the Orinoco in New Andalusia, exemplifies the low slanting forehead, as well as other points of the American formation. The entrance of the nose and the whole apparatus of smelling are very large. The heads of a Brazilian man and woman† have the low forehead, broad face, and large nose of the American variety. In a general roundness of figure they agree with the descriptions of the natives of Brazil.

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* Tab. 24 and 25 are engravings of two Eskimaux crania from the Danish colony of Nain on the coast of Labrador. The strong characters of these crania, and the marked affinity which they exhibit to the American and Mongolian races, concur with all accurate descriptions of the physical characters of the people in refuting the strange opinions of ROBERTSON "Hist. of America;" v. 2 p. 40, that the Eskimaux are descendants from the Normans. BLUMENBACH. *Dec.* 3. p. 8—10.

A similar skull from Hond Eyland (Dog's Island.) near Disko, in Baffin's Bay, is described by WINSLOW "Mém de l'Acad. des Sciences," 1722.

† The heads of a Greenland man and woman are represented in tab. 36, and 37: they came from the Danish colony Godhavn, on the west coast of Greenland. "They are large, and the cranium in particular is ample, and elongated posteriorly. The bone is remarkably thin and light, in proportion to the size. The orbits are large; the nasal bones long but very narrow." *Ibid.* *Dec.* 4. p. 12.

‡ BLUMENBACH, *Dec.* 5. tab. 46. In one of the caverns visited by this indefatigable and enlightened traveller, there were the remains of six hundred bodies, each of which was contained in a basket or bag. These remains consisted either of the bones alone, of their natural white color, or reddened by annatto, or of the same preserved in the way of mummies, with a mixture of bitumen and leaves. There were, moreover, sarcophagi of unbaked clay, five feet long and three wide, painted with figures of crocodiles, and full of bones. The situation of these cataracts is 5° 39′ N. lat. 51° W. long. from Ferro. p. 14

The head of the man is very ingeniously and perfectly preserved entire, in the state of a mummy. It is not separated from an entire embalmed body, but must have been cut off immediately after death; as the skin of the neck is equally drawn in all directions towards the foramen magnum, and fixed there by the bituminous matter employed in the process. The skin preserves the copper color verging to black which distinguishes the Brazilians. The hair is shaved round the vertex: what is left on the top of the head, and about the ears, is short, strong, and of the deepest black. A thin beard appears on the upper lip and part of the chin. The orbits and mouth are filled with a bituminous mass: it hangs by a cotton string fixed to the mouth. The slit in the external ear is filled with portions of cotton. A splendid ornament, composed of the finest feathers of the red tantulus, the toucan, and the most brilliant parrots, covered the forehead.†

There is no American, nor indeed any other race, in which the forehead is so low as in the Caribs. And in order to exaggerate a character, which they deemed beautiful, they have had recourse to artificial means of flattening this region, at the time when the bones are soft and capable of yielding to artificial pressure. As the same character of a low forehead characterizes all the Americans in a greater or less degree, similar attempts to increase this natural defect have been made by other tribes, as well as the Caribs, in both North and South America.

The fifth plate exhibits a skull belonging to the College Museum: in which there are no evidences of any artificial change of figure. The developement of the anterior cerebral lobes must have been more imperfect in this individual, than in any other example which I have seen. Setting aside what we should term this natural defect, the organization is perfect. The bony substance is dense, compact, and hard; and the entire skull consequently very heavy. The size of the head, and the strong muscular impressions, correspond, as well as the hardness of the bone,

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* BLUMENBACH, tab, 47 & 48.

† "Dec. quinta," p. 15 & 16.

with the accounts which eye-witnesses have furnished, of the colossal stature and great strength of this race.* The frontal bone is rather prominent at the glabella; it continues, nearly horizontally, backwards from the orbits, rising a little towards the vertex. A slight convex protuberance on each side marks the situation of the anterior cerebral lobes. The temporal fossa is large, and the skull consequently not wide in its lateral measurement. Although thus contracted at its upper and fore part, the bony receptacle of the brain swells out below and behind, into its usual size: the fossæ cerebelli are large.

This singular formation is attended with a change in the distribution and support of the weight, I have already mentioned, that in the human head the parts in front of the occipital condyles are heavier than those behind; so that the head falls forwards when left to itself, and is only retained in equilibrio, in the erect posture, by muscular contraction. (See page 154.) In this Carib skull, however, the parts behind preponderate, and that very decidedly; so that, I apprehend, the eyes must be habitually directed upwards; which is the more probable, as the orbits, in some degree, look upwards, even when the zygomas are horizontal. The face is characterized by its great size and strength, and the marked developement of all its parts. What the front of the skull has lost, seems compensated here. The nasal bones are not very small nor flat; the cavity is ample; the jaws and teeth powerful. The superior maxillary bone is very long from the orbit to the alveoli, and slopes regularly forwards in this part.

Another Carib skull in the College Museum coincides with this in the form of the forehead, in the direction of the eyes upwards, and in the preponderance of the parts placed behind the foramen magnum.

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* "Caribbees, properly speaking, those who inhabit the Missions of the Cari, in the Llanos of Cumana, the banks of the Caura, and the plains to the north-east of the sources of the Orinoco, are distinguished by their almost gigantic stature from all the other nations I have seen in the New Continent." HUMBOLDT, "Personal Narrative;" v. iii. p. 236.

These people were called Caribbees (Carives) by the first navigators, and are still known by that name throughout Spanish America, although the French and Germans have transformed it into Caribes, and the English have shortened it into Caribs. *Ibid.* 284.

The same character is seen in a skull engraved in the *Journal de Physique;*[*] but the representation is too badly executed to admit of a satisfactory determination whether it is a natural formation or the effect of art. Its very general existence in the native tribes of America is expressly and strongly pointed out by HUMBOLT. "There is no race on the globe, in which the frontal bone is more depressed backwards, or which has a less-projecting forehead, than the American." "This extraordinary flatness is to be found among nations, to whom the means of producing artificial deformity are totally unknown; as is proved by the crania of Mexican Indians, Peruvians, and Atures, brought over by Mr. BONPLAND and myself, and of which several were deposited in the Museum of Natural History at Paris."

He thinks that "the custom of flattening the head had its origin in the idea that beauty consists in such a form of the frontal bone, as to characterize the race in a decided manner."—The Aztecs, who never disfigure the heads of their children, represent their principal divinities, as their hieroglyphical manuscripts prove, with a head much more flattened than any I have seen among the Caribs."[†]

That in compliance with a strange notion of beauty, attempts are made by these people to flatten their foreheads still further, and that for this purpose they subject children's heads to pressure immediately after the birth, and continue it for sometime, is proved by the most respectable and abundant testimony. In certain crania very unequivocal marks of this process are found; actual indentations of the forehead, producing a degree of deformity quite different from natural depression of the skull, or from the instances of malformation which are occasionally seen. Some, indeed, have argued that even these are natural forms, and have boldly denied the possibility of producing the effect by such means as those described.[‡]

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[*] April 1789. v. 34; 1.

[†] "Political Essay," v. i. p. 154, and note.

[‡] SABATIER. "Traité d'Anatomie," t. i. p. 25. CAMPER in "Kleinere Schrif

The bones are the most solid parts of our frame; and form a kind of firm support and foundation, on which the softer structures rest. Yet physiological experiments, and the phenomena of disease, prove that they change more easily than the softer parts of the body. Their elements are continually detached and removed in an insensible manner, by the insorbents; while the loss thus occasioned is repaired by the deposition of other particles newly secreted from the blood. This continual change in the bony materials of the body is well illustrated by the experiment of mixing madder with the food of animals Soon after this has has been begun, the bony substance is found of a pink color throughout; and this dye is as quickly removed, when the madder is no longer administered. The short period in which such changes are brought about, forms a striking contrast to the indelible nature of the marks produced in the cutis by gunpowder and other coloring matters. The uninterrupted exchange of particles, carried on in the bones from the period of their first formation, allows them to accommodate themselves to the neighboring parts, and to become, as it were, formed and fashioned by their action. The conformation of the head affords the most unequivocal proof of this circumstance. The internal surface of the cranium exhibits a mould of the lobes and convolutions of the brain, to which it was adapted; and the external surface displays the most manifest impressions from the actions of the muscles, as well as traces of the form of the features, the general configuration of which may be easily conjectured from a view of the bony skull. In like manner, the shape of the bones may be affected by the pressure of tumors, by collections of pus in their cavities, by constant weights, as that of the trunk bearing on the lower limbs, before their substance is hard enough. Hence we cannot doubt that the cranium may experience a partial change of figure, if a given external pressure can be kept up for some

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ten." v. i. p. 17. ARTHAUD in "Journal de Physique," April 1789. 'Dissertation' sur la Conformation de la Tête des Caraïbes, et sur quelques Usages bizarres attribuées à des Nations sauvages.

time; and the comparative softness of its texture at birth, renders that a very favorable period for such attempts.

The objection will occur, that the functions of the brain would be suspended by an effectual pressure;—that the infant's life would be endangered. They who have seen a child's head after it has passed through a small pelvis in a difficult labor, under which circumstances it is often found squeezed into an oblong shape, will not entertain much apprehension for the effects of such manœuvres as are said to be practised on the Carib and other American newly born infants. It is not necessary, however, to suppose the force so considerable, as to affect the figure of the bone at the time: I should rather apprehend that the ultimate effect is produced by the continued action of a gentle pressure; as the thigh and leg of a rickety child slowly yield to the weight of the body. The change of form is produced organically, not mechanically.

Should it be objected, that such unnatural violence would prevent or impede the developement of the brain, and could not be borne without fatal results, I reply, that if the fact can be established, the supposition, on which this objection rests, must be ungrounded. And that it is so, I am further induced to believe by cases of large bony tumors growing within the skull, and encroaching on the brain, without causing any of those inconveniences or dangers which a small sudden pressure often produces. In the newly-born child, too, when the sutures are all open, the brain if prevented from growing in one direction, may expand easily in other quarters.

I conclude, therefore, that the thing is possible: and I shall add the evidence, which seems to me quite sufficient to prove that it is true.

Besides the Carib skull, which I have already described, in which the forehead indeed is extremely low, but the continuity of outline, regularity of form, symmetry and harmony of parts, prove that it is a natural organization; there are many others, in which the regular outline is interrupted, the smooth convexity of the skull harshly and abruptly disturbed, an uneven rising and sinking surface substituted for the naturally uniform swell of the forehead; and a configuration is thus produced, such as would naturally arise from the alleged artificial process, but totally different from any thing in the works of nature.

Various modes of proceeding are described; the differences in this respect, in the method of application, the length and constancy of the process, the resistance of the skull and brain during the pressure, and the degree of recovery after its cessation, account for the individual diversities in these compressed skulls.

The tenth plate of BLUMENBACH's first decade is the head of a male Carib from the island of St. Vincent's;* in which the frontal bone, originally very low, presents a broad indentation about its middle. The enumerated characters are, "a depressed forehead (frons retropressa;) orbits surprisingly large, patulous, and looking upwards, as is seen in hydrocephalic patients; the orbital plate of the frontal bone slanting downwards, and the superciliary margin very obtuse." p. 26.

In his second decade,† BLUMENBACH has figured the skull of a female Carib from the same island as the preceding, where the forehead is much lower, and the orbits are in like manner directed upwards. How strikingly it deviates from the ordinary construction, may be collected from the author's expressions:—"prodigiosum plane cranium"—"horrida et fere monstrosa hujus capitis distortio." The contraction of the front seems to have been compensated by expansion of the lateral and posterior parts; so that this head, when placed on the vertebral column, must evidently have preponderated backwards.

A head in all points very similar to this is in the possession of Dr. LEACH: a broad flat surface above, or rather behind the eyes, seems to mark out the situation and action of the pressure. The preponderance of the parts behind the occipital condyles is the same.

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* This is the race which occupied the West-Indian islands at the time of their first discovery by COLUMBUS, and agreed in physical characters with the Caribs of the Continent already alluded to (p. 318, note*,) from whom they were originally derived. European hostility and encroachment confined the last small remnant of this unfortunate race on a part of the island of St. Vincent's. They were here distinguished under the name of Red Caribs, from the descendants of some Negroes who escaped from a shipwreck, and whose numbers were perhaps augmented in other ways, who were called Black Caribs. The latter are merely Negroes. The hostilities of the two races have been very fatal to the former; who are now nearly extinct.—EDWARDS, *History of the West Indies;* 1. p. 411.

† Tab. 20. p. 15.

The kindness and liberality of Mr. CLINE enable me to add the engraved representation of a very interesting specimen from his collection; and thus to illustrate by direct contrast, the difference between the natural and artificial form of the Carib head. The artificial excavation of the frontal bone, and the superficial risings denoting the anterior cerebral lobes, are obvious on the first inspection. It is clear too, that this individual would have had naturally a very low forehead. A violent and unnatural bulge behind and at the sides seems to show that the contraction in front has been compensated by an equivalent extension in those quarters. The figure of the occipital bone is so changed, that the external transverse ridge, which naturally forms the posterior boundary of the basis cranii, is now far within that boundary. The face is broad across the eyes and cheeks; the interval between the orbits wide; those cavities are large, shallow, and directed upwards, The facial angle is 66°. The distance from the posterior edge of the vomer to the corresponding vertical point of the head is only 2¾ inches: the transverse measurement at the same point, 6 inches; across the coronal suture, 6¾ inches. The distance from the alveolar edge of the superior maxilla to the back of the occiput is 8 inches; from the occiput to the posterior edge of the foramen magnum, 3⅛ to the anterior, 4½. When the skull is supported on the condyles, the back part greatly preponderates.

This skull, like that which Dr. LEACH possesses, came from the island of St. Vincent's. It was presented to Mr. CLINE by a surgeon of Tobago; who stated that the individual had been chief of the Red Caribs in St. Vincent's; that he used to come to Tobago on the commercial and other business of his tribe; that he was well known there, and regarded as an intelligent, well-informed, and prudent character.*

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* Besides the skull which is figured by Mr. ARTHAUD in the *Journal de Physique*, t. 34, he mentions another, in which there was a large depression in the centre of the os frontis; p. 253.

A more detailed knowledge of the two Carib men, whose skulls are engraved in this book, would be highly interesting in physiology.

A head precisely similar to this of Mr. CLINE has been figured by HUNAULD, in the Memoirs of the Royal Academy of Sciences.*

The inferences, to which these and similar specimens lead, are completely supported and confirmed by the unanimous testimonies of the most judicious and respectable travellers; which cannot be set aside without a degree of scepticism that would equally prevent us from believing all that is stated on such authority.

LABAT relates, that "the Caribs are all well made and proportioned; their features are sufficiently agreeable, excepting the forehead, which appears rather extraordinary, being very flat, and as it were depressed. These people are not born so; but they force the head to assume that form, by placing on the forehead of the newly-born child a small plate, which they tie firmly behind. This remains until the bones have acquired their consistence; so that the forehead is flattened to that degree, that they can see almost perpendicularly above them, without elevating the head.†

CONDAMINE informs us, that "the appellation Omaguas in the language of Peru, as well as Cambevas in that of Brazil given to the same people by the Portuguese of Para, signifies 'flat-head.' For they have the strange custom of pressing between two plates the forehead of their newly-born children, in order to give them this singular shape, and make them, as they say, resemble the full moon."‡

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* 1740. p. 371. tab. 16 fig. 1.

† *Voyages aux Isles de l'Amérique* t. 2. p. 72. BLUMENBACH also cites the authority of OVIEDO *Historia General de las Indias*; 1535, p. 25. and RAYMOND BRETON *Dictionnaire Caraibe-François*; 1665. 8vo. pp. 58, 92, 145, 289.

The same custom, which belonged originally to the red-colored natives of the West Indies, has been adopted by the free Negroes or Black Caribs of St. Vincent's. See THIBAULT DE CHANVALON, *Voyage à la Martinique*, p. 39; and AMIC in *Journal de Physique*, v. 30. p. 132.

‡ *Mémoire de l'Acad des Sciences*, 1745. p. 427—8. ULLOA gives the same testimony respecting the Omaguas; *Travels in South America*, v. 1. p. 304; also TORQUEMADA *Monarchia Yndiana*; t. iii. p. 623.

A collateral proof of these practices is afforded by their having been noticed, and expressly prohibited by the Spanish ecclesiastical councils (as related by **Blumenbach**), two hundred years ago.

In the history of the third synod of the diocese of Lima, held in July 1585, a decree was passed against the Indian practice of disfiguring the head. "Cupientes penitus extirpare abusum et superstitionem, quibus Indi passim infantum capita formis imprimunt, quas ipsi vocant caito, oma, opalta;—statuimus et præcipimus," &c. &c. reciting various punishments, as, for instance, that any woman found guilty, "frequentet doctrinam per continuos decem dies mane et vesperi, pro prima culpa; pro secunda vero per viginti," &c.*

This custom has prevailed as much in North as in South America, and in the islands. **Adair** says, that the northern savages "flatten their heads in divers forms: but it is chiefly the crown of the head they depress, in order to beautify themselves, as their wild fancy terms it; for they call us Long-heads, by way of contempt." "They fix the tender infant on a kind of cradle, where his feet are tilted above a foot higher than a horizontal position; his head bends back into a hole made on purpose to receive it; when he bears the chief part of his weight on the crown of the head, upon a small bag of sand, without being in the least able to move himself."†

Lastly, the very interesting narrative of the journey to the source of the Missouri, performed by Messrs. **Lewis** and **Clarke**, informs us that the attempts at beautifying the head, by flattening its fore-part, have been and are very extensively practised among nearly all the tribes situated on the west of that great range of mountains running nearly parallel to the west coast of America, from which the waters flow on one side to the Pacific, and on the other into the Mississippi and its various tributary streams.

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* J. S. **de Aguirre** *Collectio maxima Conciliorum omnium Hispaniæ et Novi Orbis*; ed. 2. Romæ, 1655. fol. t. vi. p 204.

† *History of the North American Indians*, p. 8. See also **Lawson**'s *History of Carolina*, p. 33; and **Charlevoix** *Hist. de la Nouvelle France*, t. 3, pp. 187, 323.

"The most distinguishing part of their physiognomy is the peculiar flatness and width of their forehead; a peculiarity which they owe to one of those customs by which nature is sacrificed to fantastic ideas of beauty. The custom, indeed, of flattening the head by artificial pressure during infancy, prevails among all the nations we have seen west of the Rocky Mountains. To the east of that barrier the fashion is so perfectly unknown, that there the Western Indians, with the exception of the Alliatan or Snake Nation, are designated by the common name of Flat-heads."—"Wherever it may have begun, the practice is now universal among these nations. Soon after the birth of the child, the mother, anxious to procure for her infant the recommendation of a broad forehead, places it in the compressing machine, where it is kept for ten or twelve months; though the females remain longer than the boys. The operation is so gradual, that it is not attended with pain; but the impression is deep and permanent. The heads of the children, when they are released from the bandage, are not more than two inches thick about the upper edge of the forehead; and still thinner above: nor, with all its efforts, can nature ever restore its shape; the heads of grown persons being often in a straight line from the nose to the top of the forehead."*

Besides this general statement, applying to the western tribes altogether, these enterprising travellers note the existence of the practice on many particular occasions; as among the Skilloots (p. 389;) the Wahkiacums (p. 392;) the Sokulks, where the head was so flattened, that the forehead runs straight from the nose to the crown (p. 351;) and the Chinnooks, whose heads they speak of as having been flattened in a most disgusting manner. In one tribe which they saw on the Pacific, they expressly mention that the custom did not exist. (p. 428.)

That nothing might be wanting to this part of the proof, the very bandages employed by the Caribs have been brought into Europe. A description and figures of them may be seen in the *Journal de Physique* *

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* *Travels to the Source of the Missouri*, chap. xxiii. See also MEARES, of the natives about Nootka Sound; *Voyages from China to the N. W. Coast of America*, p. 249.

The fifth or Malay variety, including the inhabitants of the numerous Asiatic islands, and those of the Great Pacific Ocean, constitutes an intermediate link between the European and Negro. The cranium is moderately narrowed and slanting at its anterior and upper part; the face large, and all its parts fully developed; the jaws more or less prominent.

It must be confessed, that the numerous tribes included within the boundaries of this variety differ considerably from each other; and, consequently, that the whole cannot fall within one clearly-marked character. The Papua race are described as having all the appearance of Negroes; I have seen no skull, nor any representation of one, belonging to a native of New Guinea. The New Hollanders certainly partake of the Negro form, yet are still easily distinguishable from African Negroes. In the two heads engraved by BLUMENBACH,† the forehead rather slants above the eyes, but the head rises to a considerable height at the coronal suture. The nose is not so flat, nor the zygoma so prominent, as in the African. The alveolar edge of the upper jaw projects in front; the chin is not cut off, as in the Negro. The crania of New Hollanders which I have seen, correspond with these. In some, as in a female skull in the College Museum, the superior incisors are placed as obliquely as in the Negro; but none have so low a forehead and vertex as some of that race.

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* Aug. 1791, p. 132. tab. 1 & 2. The account is written by Dr. AMIC, a physician of Guadaloupe, who had seen and conversed with both Red and Black Caribs in the West Indies. In mentioning the answers which they gave to his inquiries, he says, "Contre mon attente elles se reduisirent toutes à m'assurer qu'ils ne devoient l'applatissement de leur front qu'à la pression d'une planche garnie de coton, qu'on fixoit sur cette partie pour l'empecher d'acquérir la convexité, qui lui est naturelle. C'etoit-là me dirent ils le caractére de leur nation. Pour l'imprimer on fait aux enfans porter cette planche jusqu'à ce qu'ils soient assez grands, pour qu'il ne s'efface pas. Je remarquai parmi eux un jeune homme de seize à dixsept ans, dont le front étoit bombé comme celui d'un Négre. Il repondit à mon observation, que pour ne pas le défigurer comme les autres son mère n'avoit pas voulu le soumettre á un viel coutume." p. 133

† Tab. 27 & 40.

The Otaheitean skull* does not differ in any essential points from the European formation, so far as the cranium goes. The front and lower part of the forehead may be a little contracted and slanting. The face is altogether large, and the upper jaw fully developed: its alveolar portion, too, projects slightly in front.

The head of a native of Nukahiwah,† one of the groupe called the Marquesas Islands, presents a very beautiful and symmetrical organization, corresponding to the description of the great stature, fine proportions, and strength of these islanders. Except that the face is larger, its lower part especially more considerable and prominent than in the best models of the Caucasian variety, and that the jaws and teeth altogether have a marked projection, this head is not very essentially distinguished from that form. The forehead is indeed more slanting than in the intellectual European heads; but the whole structure has unequivocal marks of an organization calculated for strength.

The skull of a Buggess,‡ from the island of Celebes, has the narrow slanting forehead, large face, and prominent jaws of the true Negro; but it combines the lateral expansion, particularly across the cheeks, of the Mongolian variety.

The arrangement of skulls under the five general forms just described is, in a great measure, arbitrary. It must not, therefore, be taken in a strict sense: we must not expect to find all the individuals, comprised under each of these varieties, decisively distinguished by the assigned characters from all others. In the endless diversity of individual forms, many instances are met with, in each variety, of organizations approaching to those of the others; so that among many Europeans and Negroes we might select skulls in which it would be difficult to determine the predominant character. The two intermediate forms between the Caucasian middle, and the Ethiopian and Mongolian extremes, complete the series of gradations. Of the numerous tribes or nations in each division, some come nearer to one and some to the other of the two immediately adjoining varieties. Thus the natives of some islands in the South Sea are hardly to be distinguished in countenance and head from Europeans; while others approach as near to the Negroes. The Marquesans, the Society, Friendly, and Sandwich Islanders, might be almost arranged under the Caucasian variety; while the natives of New Guinea, New Holland, Van Diemen's Land, New Britain, &c. Louisiade, &c. have strong claims to be admitted into the Ethiopian division; and those of the Solomon Islands, the New Hebrides, and New Zealand form so many points of transition between the two. The same observation holds good of the other varieties. Hence, if we had numerous specimens of each, we might arrange them in such a manner, that the interval between the most perfect Caucasian model and the most exaggerated Negro or Mongolian specimens should be filled with forms conducting us from one to the other by almost imperceptible gradations. We must therefore conclude, that the diversities of features and of skulls are not sufficient to authorize us in assigning the different races of mankind in which they occur to species originally different. This conclusion will be strengthened by the analogies of natural history. The differences between human crania are not more considerable, nor even so remarkable, as some variations which occur in animals confessedly of the same species. The head of the wild boar is widely different from that of the domestic pig. The different breeds of horses and dogs are distinguished by the most striking dissimilarities in the skull; in which view the Neapolitan and Hungarian horses may be contrasted. The very singular form of the skull in the Paduan fowl is a more remarkable deviation from the natural structure than any variation which occurs in the human head.

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* BLUMENBACH, tab. 26. † Ibid. tab. 50. ‡ Ibid. tab. 49.

The oblique position of the anterior incisors in the Negroes and some other tribes which have prominent jaws, is the only national difference I know of in the teeth. Their size and form exhibit merely individual differences. The complete and minute correspondence of the teeth in number and form, through all races of men, is a strong argument for the unity of the species.

BLUMENBACH* has pointed out what he conceived to be a peculiarity in the teeth of some Egyptian mummies, which first attracted his notice on examining two specimens in the year 1779. The incisors, instead of possessing their ordinary thin cutting edges, were thick in their bodies, and resembled truncated cones; the cuspidati were not pointed, as is usual, but broad and flat on the masticating surface, and very similar to the neighboring bicuspides. The same circumstances have been observed in the other specimens, as in a mummy at Cambridge, described by MIDDLETON,* in another at Cassel;† and in a third at Stuttgard.‡ BLUMENBACH observed a similar structure in the head of a young mummy, which he opened in London;|| and in another which he received as a present from Mr. TURNER, of Cambridge.§ "There must," he observes, "be great differences in the crania of various mummies, when it is considered that the practice of embalming the body after death prevailed in Egypt for many ages, during which great vicissitudes occurred in the government and inhabitants of the country; consequently we cannot reasonably expect to find this formation of the teeth in every specimen: yet it constitutes a singular variety, and deserves mention, as it may assist in distinguishing the mummies of some particular age and nation. It would be difficult to assign a satisfactory cause for this peculiarity; yet we may not improbably ascribe it in great part to the kind of food taken by the Egyptians, which Diodorus Siculus expressly describes to have consisted of vegetables, roots, &c. Hence the teeth must have been worn down; and it has been observed that these organs, when reduced by attrition, or purposely diminished in length, grow thicker, both in man and animals."¶

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* "Von den Zähnen der alten Ægyptier, und von den Mumien," in the "Gött. Magazin der Wissensch. und Litteratur." p. 1.

"De Gen. Hum. Var. Nat." sect. iii. § 64.

"Beyträge zur Naturgeschichto," part ii. "Ueber den Ægyptien Mumien," § 11.

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* "Monument Antiq. in Works," v. 4. "Quod vero singulare et prodigii fere loco habendum. (dentes) anteriores s. incisores, non acuti illi quidem atque ad incidendum apti, sed perinde ac maxillares lati plane atque obtusi sunt."

† BRUCKMANN'S "Nachricht von einer Mumie;" Braunschweig.

‡ BLUMENBACH, "Beyträge;" part 2, page 68.

|| "Philosophical Transactions," 1794. part ii. p. 184

§ "Dec. quarta Craniorum," p. 4.

¶ "De G. H. Var. Nat." sect. iii §64.

A similar formation of the teeth was noticed by **Winslow**[*] in the cranium of a Greenlander from the Isle of Dogs (Hond-Eyland), on the west coast of Greenland. "The incisors," says this anatomist, "are flat from before backwards, and short, instead of having a cutting edge; hence they resemble grinders more than cutting teeth." "Mr. **Riecke**, who presented me with this cranium, said that the inhabitants of Hond-Eyland eat their meat raw." "They move their jaws in a very singular manner, and make several grimaces while chewing and swallowing. It was the observation of this spectacle that induced him to seek for an opportunity of discovering whether these islanders possessed any peculiarity of construction in their jaws or teeth."

This account is confirmed by two Eskimaux crania[†] in the possession of **Blumenbach**, which exhibit the same worn appearance of the teeth. It is well known, he observes that the Eskimaux are derived from the same race with the Greenlanders, and that their name has its origin from their practice of eating raw flesh.

A similar configuration of the inferior incisors was found in the head of the Guanche mummy, figured in **Blumenbach's** *Fifth Decade*, tab. xlii. p. 8.

I have seen the same configuration in the heads of Egyptian mummies, and in other instances: and am fully convinced that there is no real original difference in the form of the teeth in these cases; and that the observed peculiarity is entirely owing to the mechanical attrition which the teeth had experienced in all the examples. As the incisors are wedge-shaped, and increase gradually in thickness from their cutting edge to the gums, when half worn away they lose their natural appearance of cutting teeth, and resemble in form those found in the crania above mentioned. If the teeth are naturally large and strong, the appearance will be more marked. We cannot admit an original difference of form, until it is proved by the exhibition of entire teeth in which the enamel has not been worn away from the masticating surface.

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[*] "Mém. de l'Acad. des Sciences de Paris;" 1722. p. 323.

[†] "Dec. tertia," tab. 24 and 25.

At all events, the notion that the teeth grow thicker in consequence of the attrition of their surfaces, is not admissible No point is more clearly ascertained, than that these organs have no powers of growth, or organic change: and that they experience no alteration, after appearing through the gum but that of mechanical wearing or chemical decay. That their substance possesses neither vessels nor nerves, is, I think, fully proved by what I have stated in another place.[*]

The assertion of BUFFON, ERXLEBEN, and others, that the teeth of the Calmucks are longer, and separated by wider intervals from each other, is contradicted by the specimens of their crania in the possession of BLUMENBACH.

Certain colors and forms are given to the teeth artificially, in some instances, by way of ornament.

Mr. MARSDEN[†] informs us that the Sumatrans communicate to the teeth a jetty blackness by the empyreumatic oil of the cocoa-nut shell; and that they even abrade the enamel, that they may receive and retain the dye more perfectly.

The very general practice among the Malays and Asiatic islanders, of chewing the areka-nut, betel-leaf, and chunam or lime,[‡] turns the teeth black, unless great pains are taken to prevent it, and covers them with a brownish black incrustation. From one or the other of these causes the teeth are blackened in the Javanese[§], the Birmans[||], Tunquinese[¶], and Buggesses [**]

Some Negro tribes file their teeth, so as to make them conical and sharp pointed ;[††] some file away their inner edges,[‡‡] or notch them;[*] some even grind them away, down to the gums.[†]

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[*] In Dr. REES's "Cyclopædia," art CRANIUM.

[†] "History of Sumatra :" ed. 3. p 53.

[‡] The practice is described particularly by DAMPIER. "Voyages," v. 1.° p. 318 "It tastes rough in the mouth, and dyes the lips red, and the teeth black ; but it preserves them, and cleanseth the gums." See also v. 2. p. 54.

[§] BLUMENBACH, tab 39. HAWKESWORTH's "Collection of Voyages," v. 3. pp 286, 347.

[||] SYMES, "Embassy to Ava :" v 2. p. 235.

[¶] DAMPIER, v. 2. p. 41.

[**] BLUMENBACH, tab. 49.

[††] CHURCHILL's "Voyages," v. 5. pp. 139, 143, 385. "Philos Trans." v. 73. p. 92. WINTERBOTTOM "on the Native Africans :" v 1. 104. The Sumatrans also do it · MARSDEN, p 53

[‡‡] TUCKEY's "Narrative of a Voyage to the Congo," pp. 80, 124.

A more or less complete abrasion of the enamel is very common among the Asiatic islanders.[‡]

The observations in the following chapter respecting the varieties of form in general, include the subjects of national features and form of the skull. I shall only make a few remarks here on some attempts at explaining the latter subjects.

Climate has generally been brought forwards as the cause of the varieties that distinguish man. It has been almost universally represented as the source of differences in color, and not much less depended on for solving the great problem of varieties of form. "The inquiry into the causes of difference of features is exposed," says BLUMENBACH, "to such serious difficulties, that we can only expect to arrive at a probable solution.

"That climate is the principal agent in producing difference of features, is proved to my satisfaction, by three arguments.

"1. In the natives of certain regions, a national countenance is so common and universal in persons of all conditions, that it can be referred to no other cause. The Chinese may serve as an example; the characteristic flattened countenance being as general among them, as great symmetry and beauty are among the English and Majorcans.

"2. Unless I am greatly deceived, there are instances of people who, after leaving their old abodes, have in progress of time assumed new features, corresponding to their new situations. Thus the Yakuts are referred, by those who have investigated northern antiquities, to the Tartar race: but their countenance is now completely Mongolian, according to the reports of the most accurate observers, and to a Yakut skull in my collection. Thus also it has been observed that the Creole offspring of European parents in the West-Indies have, in some degree, exchanged their native British features for those characteristic of the American aborigines, and have acquired their deeper eyes and higher cheeks." He adds, that the northern invaders, who have at different times entered India, have gradually assumed the character which the climate has impressed on the native Hindoos.

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[*] TUCKEY'S "Narrative of a Voyage to the Congo," p. 210.

[†] VANCOUVER found in the natives of Trinidad Bay, on the north-west coast of America, that "all the teeth of both sexes were, by some process, ground uniformly down horizontally to the gums." V. 2. p. 247. It was also observed by PEROUSE, "Voyage round the World," v. 2. p. 138.

[‡] In Magindanao; FORREST, "Voyage to New Guinea," p. 237: in Celebes; BLUMENBACH, dec. 5. tab. 49: in Java; HAWKESWORTH, v. 3. p. 349. BLUMENBACH "de G. H. Var. Nat." p. 231.

"3. Nations, which can be deemed only colonies of one and the same race, have acquired different characteristic countenances in different climates. It is now proved that the Hungarians and Laplanders come from one stock. The latter have acquired, in their northern abodes, the cast of countenance peculiar to the inhabitants of those cold regions; while the former have assumed a more elegant formation in their milder seats near Greece and Turkey."*

That so able a writer could find no better proofs in support of his opinion, only shows how completely unfounded that opinion is.

The flat face of the Chinese not only extends throughout that vast empire, which covers nearly forty degrees of latitude and seventy of longitude, but also over the neighboring regions of central and northern Asia, the north of Europe, and of America; over a very large portion of the globe, including every possible variety of heat and cold, elevation and lowness, moisture and dryness, wood, marsh, and plain.

That European Creoles in the West Indies, in America, and in the East have preserved their native features in all instances where no intermixture of blood has occurred, is proved by the uninterrupted experience of the Spaniards, Portuguese, and English, who have had foreign colonies, in climates most different from their own, longer than any other nation.

If the Yakuts, which are now decidedly Mongolian in their features, had originally the Caucasian formation, and if the northern invaders of India have assumed the Hindoo countenance, the change must have been effected by intermarriages. All who have visited India, and attentively examined its various people, unanimously represent that the Afghauns and Mongols of pure blood are, at this moment, just as distinct in features from the Hindoos as the parent races are in their original seats.

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* "De G. H. Var. Nat." sect. iii. § 57.

Respecting the case of the Hungarians and Laplanders, if we admit their descent from one stock, which is probable, let us next ascertain what the amount of the differences between them may be, and then inquire whether mixture with other races may not have produced these.

Blumenbach proceeds to observe, that the intermixture of races has a great effect in modifying the natural countenance; and that the ancient Germans, the modern Gipsies, and the Jews, afford examples of peculiar and distinctive casts of countenance being preserved in every climate. These well-known facts are quite sufficient to overturn the hypothesis which refers the differences of features to climate; and a short examination of the races in any part of the world will soon supply numerous additional ones. Indeed, I do not know a single well established fact or sound argument in its favor.*

Some have even attempted to show how climate might operate in producing national features. "En effet," says Volney, "j'observe que la figure des Négres représente précisement cet état de contraction que prend notre visage lorsqu'il est frappé par la lumière et une forte réverbération de chaleur. Alors le sourcil se fronce; la pomme des joues s'éléve; la paupière se serre; la bouche fait la moue. Cette contraction, qui a lieu perpétuellement dans le pays nud et chaud des Négres, n'a-t-elle pas du devenir le charactére propre de leur figure?"† Unfortunately for these speculations, the Negro features occur in numerous tribes spread over a great extent of country, with various climates, and in many instances where the heat is by no means excessive; the character too, is permanent, after any number of generations, when the Negroes are taken into other climes. Again, the most opposite features occur under similar climates in different parts of the world. There are races with flattened countenances, as well as with narrow and elongated visages, in hot countries. The whole notion is, however, so fanciful and so unphilosophic, that it hardly deserves serious attention; and I therefore regret to find that the idea is so far countenanced by an instructive writer on this subject, that he speaks of the numerous gnats which annoy the New Hollanders as contributing to the formation of their peculiar physiognomy.

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* This subject will be resumed in the chapter on the causes of the varieties of the human species.

† *Voyage en Syrie et Egypte*, t. 1. p. 74.

The custom of carrying the children on the back has been referred to, in order to explain the flat nose and swoln lips of the Negro. In the violent motions required in their hard labor, as in beating or pounding millet, &c., the face of the young one is said to be constantly thumping against the back of the mother. This account is seriously quoted by BLUMENBACH.

The testimonies concerning the employment of pressure, in order to flatten the nose, are so numerous and circumstantial, that we cannot doubt of the attempt being made. It is practised among the Negroes, Hottentots, Brazilians,[*] Sumatrans,[†] and South-Sea Islanders:[‡] we have, however, no proof that the figure of the part is ever changed by such attempts; while on the contrary, it can be shown most clearly, that the well known flatness of the nose is the natural formation of the organ in the Negro, and the notion of its being produced by pressure is justly ridiculed by that intelligent observer, Dr. WINTERBOTTOM.[||] The children of African parents in Europe, America, and other situations, where there are opportunities of knowing that no means are used to flatten the nose, resemble in all respects those born in Africa. Why, indeed, should artificial causes be adduced to account for the flatness of this part in so many dark colored races? Do not the various parts of the countenance harmonize equally in both cases? Would it improve a Negro or a Chinese face to introduce into it an aquiline nose? In short, these flat noses have all the characters of natural construction about them, equally with those of a different figure; and exhibit none of the marks of violence and artificial change, which are seen in the foreheads of some Caribs. Moreover, the diversities extend so generally through the whole bony fabric of the head, and are observable in so many parts where external pressure could have no influence,—not to mention that they consist, in many instances, of formations just the reverse of what pressure could effect,—that we cannot have the smallest hesitation in rejecting entirely the notion of external influence, and ascribing them to native variety. This conclusion is confirmed by the fact, that all the peculiarities of the Negro cranium exist in the fetus: that the prominent jaws, flat nose, and all other characters are found as strongly marked in the youngest embryo as in the adult.

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[*] DE LERY. *Voyage en la Terre du Brésil*: pp. 98, 265.

[†] MARSDEN, *History of Sumatra*; p 44.

[‡] "The figure of the nose seems to have been an object worthy the attention of the Midwives at Otaheite: and since they are of opinion that a broad somewhat flat nose is ornamental, they depress the nose immediately after the birth of the child, and repeat this action upon the child while it is still tender." "The women of the Hottentots squeeze the noses of their children flat with the thumb (KOLBE. *Description of the Cape of Good Hope*; i. 52:) and i Macassar they flatten the noses of the children, and repeat the operation several times every day, softening the nose at the same time with oil or warm water." FORSTER, *Observations on a Voyage round the World*, p. 593-4. See also p. 556.

[||] *Account of the Native Africans*, i. p. 201.

" I examined," says SOEMMERRING, a Negro embryo and a child only a few months old, and found the jaws as prominent, the lower part of the nose as broad and flat, as in the parents. There was no vestige of any violence; but the form of the nose was naturally different from that of white children. CAMPER* examined, several years ago, with the same view, Negroes of various ages, including fetuses. He observed nothing particular in the nose; but he concluded that this organ will be less prominent, other circumstances remaining the same, when the parts below it come forwards, and that the lips must be larger and thicker in order to cover the teeth completely.

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* In his *Lecture on the Origin and Color of the Blacks*, describing the fetus of an Angola Negress, he says, " You see that the nose, the lips, the whole face, correspond completely to those of adult Africans: you may be convinced that the nose is not depressed after birth, but that an immature being like this has already every lineament of its race." *Kleinere Schriften*; b. 1. st. 1. p. 43.

"My friend BLUMENBACH asserts, from the examination of two Negro children in the Royal Museum at Göttingen, what BUFFON also maintained, that the flat noses are congenital, not artificial; and refers to the engravings of RUYSCH and SEBA in confirmation of the same point. LODER possesses a Negro embryo of four or four months and a half, in which the peculiar form of the nose and jaws is very plain."*

These arguments receive a further confirmation from three of the crania engraved by BLUMENBACH;† of a Jewish girl, five years old; a Burat child, a year and a half; and a newly-born Negro; in which the characters of the Caucasian, Mongolian, and Ethiopian varieties are as strongly represented as in the heads of adults. As these skulls are very characteristic I have added an engraving of them to this work, (see plate VI.)

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[*] *Ueber die Korp. Versch.* § 4.

LUDLOW gives a similar testimony respecting two Negro embryos in his collection. *Grundriss der Naturgeschichte der Menschen Species*, § 14. p. 121.

[†] *Dec. altera*, tab. 28, 29, 30.

CHAPTER V.

Varieties in Figure, Proportions, and Strength.—The Ears—effects of Art upon them, and in other parts of the Body—The Mammæ.—Organs of Generation.—Fabulous Varieties.

In consequence of the foramen magnum being placed further back in the head of the Negro than in that of the European (see page 310) and of the head being consequently situated more forwards on the vertebral column in the former than in the latter, the occiput of the Negro projects less behind the spine. Hence a line drawn from the posterior extremity of the skull along the nape of the neck, which dips in considerably under the head in the European is nearly straight in the African, as if a part of the cranium had been sliced off. The hind head is still farther reduced in the monkey kind.

Artists have taken great pains to determine the proportions which the parts of the human body, the head, neck, trunk, and limbs, bear to each other; and to discover the relative magnitude of these, which ought to be found in the best-constructed frame; in short to fix a standard of perfection on the model of beauty. If only one kind of form and one set of proportions were consistent with strength and activity, it would be worth while to pay some attention to these laborious efforts of painters and sculptors, at establishing how many times length of the head is contained in the whole body, in the trunk, the upper or lower limbs; how many noses are in the head, &c &c. Even then, the strange method they have adopted, of measuring certain celebrated statues, seems as little likely to accomplish the professed object of instructing us in natural proportions, as the academic exercises of drawing old-painted casts are to confer a power of representing living forms and attitudes. A little attention to nature, which is indeed too often neglected in learned investigations of proportions, and in academic studies, will convince us, that even in the same race, individual varieties are endless in number and great in degree, without any diminution of strength and activity: and that forms and relations very different from each other may yet be thought equally beautiful by those who venture to judge without knowing the proportions of the ancient statues. Still greater differences exist between the several races of mankind: insomuch, that if we adopt for the model of beauty the standard of proportions discovered in the Greek statues, a great part of the human race will be cut off, by its very organization, from all chance of participating in this endowment. When, however, we find that Hottentots and American savages will outrun wild animals in the chace, will pursue and hunt down even deer; that they will accomplish long journeys on foot over the most difficult countries, where there is no path to direct, and every obstacle to obstruct their progress; that the effeminate Hindoos, as we frequently call them, will keep up with horses, and perform astonishing journeys in a short time: that the South-Sea Islanders amuse themselves for hours together by swimming about in the strongest surf which would instantly destroy a boat or vessel; we shall be obliged to allow that the form and proportions to which we are most accustomed are not essential to bodily vigor and flexibility of movement. Our own inferiority in these respects arises, I am aware, from want of exercise, not from organic deficiency. Civilized man is ignorant of his own powers: he is not sensible how much he is weakened by effeminacy, nor to what extent he might recover his native force by habitual and vigorous exercise of his frame.

The body is described as broad, square, and robust; the extremities short and nervous; and the shoulders high in the Mongolian tribes, which entered Europe in the thirteenth century. See p. 306.

"The Calmucks," says **Pallas**, "are often very strong about the neck, but slender and thin in the limbs. You hardly ever see corpulent persons among the common people; even those who are rich and of higher rank, living in indolence and abundance, do not become immoderately large; while, on the contrary, numerous fat and unwieldly individuals are seen among the Kirgises, and other Tataric pastoral tribes, who follow exactly the same mode of life."[*]

Blumenbach possesses the entire skeleton of a Don Cossack, whose head, as exhibited in the fourth plate of his first decade, is marked with the characters of the Mongolian variety. The broad and flat face, the harsh muscular impressions and irregular outlines of this skull, and the construction of the skeleton in general, correspond to the character which this race bears for strength and hardiness, and to the alarms which they generally create as enemies.

"Habitus in totum horridus. Orbitæ maxime profundæ et latæ, sed valde depressæ. Narium apertura late patula." "Limbus plani semicircularis ubi a processu orbitali externo ossis frontis sursum vergit, in acutum quasi jugum abiens; anguli alarum maxillæ inferioris fere monstrose extrorsum tractæ, et masseterum insertione valde inæquales et quasi hispidi. Crassities ossis occipitalis prope protuberantias enormis. Sed et textura ossium calvariæ tam densa, ut hinc illinc casu detritæ marmoris durissimi aut iaspidis politi in modum niteant. Hinc et pondus universi cranii ingens. Verum et reliqui sceleti partes capitis horridæ conformationi respondent. Cylindrica v. c. ossa præter modum crassa et ponderosa. Pectoris os quatuor fere digitos transversos latitudine æquans, et quæ sunt hujus generis alia, rude robur testantia."

Mr. **Rollin**, the surgeon who sailed with **La Perouse**, has given us the measurements of the Chinese whom he saw at the Baie de Castries, on the east coast of China, in about 52° N. lat.

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[*] *Sammlungen Hist. Nach. ueber die Mongol. Völkersch.* 1 th. p. 98.

and 141° E. long.; and also those of the natives of the opposite great island of Tchoka, or Saghalien.

MEN.	TCHOKA. Ft.	In.	Lines.	BAIE DE CASTRIES. Ft.	In.	Lines.
Ordinary stature	5	0	0	4	10	0
Circumference of the head	1	10	4	1	9	0
Long diameter	0	9	8	0	9	0
Short	0	5	8	0	5	4
Length of upper extremity	2	1	6	2	1	0
- - - lower	2	8	0	2	6	0
- - - foot	0	9	5	0	9	0
Circumference of the chest	3	2	0			
Breadth of ditto	1	1	4	0	11	0
Circumference of the pelvis	2	6	0	2	3	0
Height of the vertebral column	1	11	0	1	10	0
WOMEN.						
Circumference of the pelvis				2	2	10*

The measures are French; of which the foot is to that of England as 1.066 to 1.000.

The trunk is more slender in the Negro, particularly about the loins and pelvis: the dimensions of the latter cavity are considerably smaller than in the European, and the extremities in some instances longer. I found the following proportions in a full-grown African lad of seventeen.

	Ft.	In.
Length of the body (lying dead on a table)	5	7
- - - - upper extremity	2	7
- - - - lower	3	6
Breadth from shoulder to shoulder	1	0
Circumference of the pelvis, between the crista ilii and the great trochanter	2	1½
Breadth between the anterior superior spines of the ossa innominata	0	8

The two latter measurements, in an Englishman of 5 feet 9 inches, were respectively 2 feet 11 inches, and 10½ inches.

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* PEROUSE, *Voyage round the World*; v. iii. p. 247.

In a Negro skeleton of 5 feet 7½ inches, the measurement between the anterior superior spines was 8½ inches.

Soemmerring gives the following statement of comparative measures :—

	In.	Lines.
" In my skeleton of a Negro, about 20 years old, the great diameter of the pelvis is	3	11½
the small	3	7½
In another of 14 years, the great diameter is	3	2
the small	2	9
In an European of 16 years, the great diameter is	4	3
the small	3	9
In an old well made European, inferior in stature to the Negro of 20 years, the great	4	6
the small	3	11"*

Camper states that the great diameter of the pelvis, from one os innominatum to the other, was to the small diameter, from the sacrum to the symphysis pubis, in the

Negro	as, 39 to 27½
European	41 ... 27

Yet the Negro was much taller than the European.

The proportion in another European was as	44 to 28
In **Albinus**'s male skeleton	66 .. 43
In a female European skeleton	49 .. 28
In two others	44 .. 28
- - the Farnese Hercules	48 .. 34
- - Antinous	40 .. 34
- - Apollo	36 .. 28
according to **Albert Durer**	35 .. 20
Venus de' Medici	46 .. 34.†

The same slenderness of the trunk may be observed in some of the Indians: it is at least apparent in the Lascars, who come to this country in the East-India ships. Their legs also are long. There are no actual measurements of these.

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* *Transactions of the Dutch Society at Rotterdam*, in Dutch; v. 1.

† *Von der kerp. Verschied.* p. 34—5.

Mr. Rollin, to whom I have already referred, ascertained the proportion of the body in males and females at three different points on the western coast of the American Continent. The following are the results in French measures ;—[*]

	Conception—Chili 36° 41′ S. Lat.			Monterey—North America, 36° 41′ N. Lat.			Baie des Français—North America, 58° 38′ N. Lat.		
	Feet.	Inches.	Lines.	Feet.	Inches.	Lines.	Feet.	Inches.	Lines.
MEN.									
Common stature - - - -	5	1	0	5	2	6	5	3	0
Long diameter of the head, from the superior angle of the occiput to the chin	0	8	4	0	9	0	0	9	5
Short ditto ; from the centre of one parietal bone to the other - -	0	5	0	0	5	4	0	5	6
Upper extremity ; from the head of the humerus to the end of the middle finger	2	1	6	2	1	9	2	2	3
Lower ditto : from the head of the femur to the heel - - - -	2	8	0	2	9	0	2	10	5
Length of the foot - - -	0	9	4	0	10	0	0	10	6
Breadth of the chest between the shoulders	1	0	0	1	1	0	1	1	4
Breadth of the shoulders - -	1	4	8	1	7	0	1	7	5
Height of the vertebral column, from the first vertebra to the sacrum - -	1	10	0	1	11	0	2	0	4
Circumference of the pelvis - -	2	4	4	2	6	8	2	7	5
WOMEN.									
Long diameter of the head - - -	0	8	0	0	8	5	0	8	10
Short ——— - - -	0	4	11	0	5	3	0	5	5
Length of the upper extremity - -	2	0	7	2	1	0	2	1	6
——— lower ——— - - -	2	5	2	2	6	0	2	6	8
——— foot - - - - - -	0	8	0	0	8	6	0	8	9
Breadth of the chest - - - - -	0	10	6	0	10	9	0	11	3
——— shoulders - - - - -	1	2	0	1	2	8	1	3	3
Height of the vertebral column - -	1	8	0	1	8	6	1	8	9
Circumference of the pelvis - - -	2	5	0	2	6	0	2	6	0
Breadth between the anterior superior spinous processes - - - - -	0	8	0	0	8	5	0	8	10

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[*] Perouse's *Voyage*, v. iii. p. 222.

The fine forms, the uncommon symmetry, the great strength and activity of many tribes in the South-Sea Islands have been noticed by all who have had intercourse with them.* The attention of **Langsdorff** was particularly attracted by a youth named **Mufau**, twenty years of age, whom he saw at Nukahiwah, one of the Marquesas Islands. His height was 6 feet 2 inches (Paris measure—between 6 feet 7 and 8 English;) his figure and strength perfect: the following are the measures in French feet and inches of various parts of his body; from which those who are conversant with academic proportions will be able to decide whether his frame was rightly constructed or not:—

	In.	Lines
From the point of the shoulders to the tip of the longest finger	22	7
From the top of the skull to the chin	10	0
- - - - - - - - - - - - navel	31½	0
- - - - navel to the division of the thighs	10½	0
- - - - division of the thighs to the sole of the foot	38	0
Length of the foot	12½	0
Greatest breadth of ditto	5½	0
Breadth across the shoulders	19	2
Circumference at the same part	40	0
Breadth across the breast	15	0
Circumference of the breast	42	0
- - - - - - - - head round the forehead and above the ears	28½	0
- - - - - - - - abdomen about the spleen	32	0
- - - - - - - - pelvis at the hip	42	0

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* "The people of the Marquesas and Washington Islands excel, in beauty and grandeur of form, in regularity of features, and in color, all the other South-Sea Islanders. The men are almost all tall, robust, and well made. Few were so fat and unwieldy as the Otaheiteans; none so lean and meagre as the people of Easter Island. We did not see a single cripple or deformed person, but such general beauty and regularity of form, that it greatly excited our astonishment. Many of them might very well have been placed by the side of the most celebrated chef d'œuvres of antiquity, and they would have lost nothing by the comparison." **Langsdorff's** *Voyages and Travels in various parts of the World*, v. 1, p. 108.

Circumference of the upper part of the thigh -	35	0
- - - - calf - - - - - -	17½	0
- - - - ankle at its smallest part -	10	0
- - - - upper part of the arm - -	13½	0
- - - - lower ditto - - - - -	13½	0
- - - - hand - - - - - -	11½	0
- - - - neck - : - - - -	16	0[*]

The natives of New Holland[†] and Van Diemen's Land[‡] are small in stature, with long and slender limbs: which seems to be owing in part to the bad quality and deficient quantity of their food (see page 185). It is always of the least nutritious kind, and scarce; and this scarcity is often aggravated to actual famine, under which the miserable natives are reduced to the appearance of spectres,[||] and probably often perish from inanition.

With these differences in stature and proportions we may reasonably expect to find various degrees of bodily strength combined. The Spaniards, in their first intercourse with the New World found the natives in general much feebler than themselves; and the inability of the former to sustain the severe labor of the mines, led to the introduction of African slaves, one of whom was equal to three or four Indians.* In engagements between troop and troop, or man and man, the Virginians and Kentuckians have always shown themselves stronger than the American savages.† HEARNE, MACKENZIE, PEROUSE, LEWIS, CLARKE, and others, have found the same inferiority of physical force in various parts of the North-American continent.

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[*] *Voyages and Travels in various Parts of the World.* p. 109. "We were told says LANGSDORFF, "that a chief of a neighboring island, by name UPOA, with equally exact proportion as MUFAU, was a head taller, so at least ROBERTS and CABRI both assured us: if they are correct, this man must be nearly seven Paris feet high." The vigor and activity of MUFAU seem to have been equal to his stature: "though he had never, till now, been on board an European ship, he ran up the mainmast many times together of his own accord, and threw himself from it into the sea, to the great astonishment of the spectators. He had actually gone up one day with the intention of throwing himself from the topmast gallery; but Captain KRUSENSTERN called him back, and would not permit it. It was impossible to see, without equal shuddering and astonishment, how he would spring from such a height, and balance himself in the air for some seconds, with his feet drawn up against his body, so as to keep his head up: from the force of the fall, and the great weight of his body, he came with so violent a plunge into the water, that several seconds elapsed before he appeared again on the surface." p. 170.

[†] COLLINS, *Account of the English Colony, &c.* p. 553. PERON, *Voyage de Découvertes*; t. 1. tab 20.

[‡] COOK *Voyage to the Pacific*; v 1. p. 96.

[||] COLLINS, *lib. cit.* PERON, v. 1. p. 463, et suiv.

The testimony of PALLAS respecting the Mongolian tribe of the Burats is very remarkable: "Their appearance is generally effeminate; and they are mostly so small in stature and weak, that five or six Burats are often unable to effect what a single Russian can accomplish. This want of power is not the only circumstance which proves, in the Burats and other Siberian nomadic people, that a mere animal diet is unnatural, and incapable of maintaining in perfection the physical prerogatives of our species. The body in all these people is remarkably light in comparison to its size. You can raise and hold up the children with one hand, when those of the Russian boors of the same age could only be lifted with both hands. Even adult Burats, compared to the Russians, are astonishingly light; so that the horses, which are not indeed powerful, when tired by a Russian rider, recover themselves if a Burat takes his place."‡

In order to procure some exact comparative results on this point, PERON took with him on his voyage an instrument called a dynamomètre, so constructed, as to indicate, on a dial-plate, the relative force of individuals submitted to experiment. He directed his attention to the strength of the arms and of the loins, making trial with several individuals of each kind; viz. twelve natives of Van Diemen's Land, seventeen of New Holland, fifty-six of the island of Timor, seventeen Frenchmen belonging to the expedition, and fourteen Englishmen in the colony of New South Wales.

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* HERRERA, Dec. 1. lib. ix. cap. 5.

† VOLNEY, *Tableau des Etats-unis*; t. 1. p. 447.

‡ *Sammlungen Histor. Nachricht.* p. 171—2.

The following numbers express the mean result in each case; but the details are all given in a tabular form in the original.

	STRENGTH	
	of the Arms. Kilogrammes	of the Loins. Myriagrammes
1. Van Diemen's Land - - - - - -	50.6	
2. New Holland - - - - - - - -	50.8	10.2
3. Timor - - - - - - - - - - -	58.7	11.6
4. French - - - - - - - - - -	69.2	15.2
5. English - - - - - - - - - -	71.4	16.2*

The highest numbers in the first and second class were respectively, 60 and 62; the lowest in the English trial, 63, and the highest 83, for the strength of the arms. In the power of the loins, the highest among the New Hollanders was 13, the lowest of English 12.7, and the highest 21.3.

These results offer the best answer to the declamations on the degeneracy of civilized man. The attribute of superior physical strength, so boldly assumed by the eulogists of the savage state, has never been questioned or doubted. Although we have been consoled for this supposed inferiority by an enumeration of the many precious benefits derived from civilization, it has always been felt as a somewhat degrading disadvantage. Bodily strength is a concomitant of good health, which is produced and supported by a regular supply of wholesome and nutritious food, and by active occupation. The industrious and well fed middle classes of a civilized community may therefore be reasonably expected to surpass, in this endowment, the miserable savages, who are never well fed, and too frequently depressed by absolute want, and all other privations.

In the first Section, CHAP. V. I have pointed out a difference between the structure of the human subject, and that of the monkey, in the relative length of the arm and fore-arm. The latter is always the shortest in man; while the two are equal in our near neighbors, or the fore-arm is even the longest. The Negro holds, in this respect, a middle place, about equi-distant from Europeans and monkeys. "I measured," says Mr. WHITE, "the arms of about fifty Negroes, men, women, and children, born in very different climates, and found the lower-arm longer than in Europeans, in proportion to the upper-arm and to the height of the body. The first Negro on the list is one in the Lunatic Hospital at Liverpool: his fore-arm measures 12¾* inches, and his stature is only 5 feet 10½ inches. I have measured a great number of white people, from that size up to 6 feet 4½ inches, and among them one who was said to have the longest arms of any man in England; but none of them had a fore-arm equal to that of the black lunatic.

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* PERON, *Voyage*, t. 1. chap. 20. p. 446, et suiv; t. 2. *Additions and Corrections*, p. 460, et suiv.

"I have measured the arms of a great number of European skeletons, and have found that the os humeri or upper arm exceeds in length the ulna, which is the longer bone of the fore-arm, by 2 or 3 inches; in none by less than 2, in one by not less than 3⅛ inches. In my Negro skeleton the os humeri is only 1⅛ inch longer than the ulna. In Dr. TYSON's pigmy, the os humeri and ulna were of the same length; and in my skeleton of a common monkey the ulna is ¾ of an inch longer than the os humeri."†

Of a Negro skeleton in the very valuable collection of Mr. LANGSTAFF, the entire height is 5 feet 7½ inches: the humerus measures 12¾ inches, the ulna 11⅛. In the individual mentioned at p. 342, the upper-arm was 13 inches, the ulna 11½.

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* The ulna of the giant in the College Museum is only one inch longer than this. See page 161.

† WHITE *on the Regular Gradations*; p. 52 and following. See also the tables, p. 45 and 46.

The comparative results of several measurements are placed in succession in the following list:

	Stature.		Length of Os Humeri.	Length of Ulna.
	Feet.	Inches	Inches.	Inches.
An Englishman - - -	6	4½	16	12¼
Ditto - - - - - -	6	1	15½	11⅛
Ditto - - - - - -	6	0	15	11⅜
Ditto - - - - - -	5	9½	14	11
Ditto - - - - - -	5	7	12¾	10
Ditto - - - - - -	5	4½	12⅛	10 1/16
Ditto - - - - - -	5	0	12¼	9⅜
Englishwoman - - -	5	4	13	9¼
Ditto - - - - - -	5	0	12¼	8⅝
European male skeleton	5	8	13	9⅞
Ditto - - - - - -	5	5	12½	10
A Negro at the Lunatic Hospital, Liverpool -	5	10½	15	12¾
Another from Virginia -	5	5½	13½	11¾
Another from the Gold Coast - - - - -	5	8	13	12¼
Another - - - - -	5	0	12	10½
Negro Skeleton - - -	4	11	11	9⅛
Another - - - - -	5	7½	12¾	11½
A Lascar - - - - -	5	4	12¾	10½
Venus de Medici - - -	5	0	13½	9¾
TYSON's chimpansé (Simia troglodytes) - - - -	2	2	5½	5½
Mr. ABEL's orang-utang -	2	7	9	10
CAMPER's ditto - - -	Less than 30		8½	9
Mr. WHITE's monkey -	2	2	4¼	5

The legs of the Hindoos are said to be long, and those of the Mongolian nations short, as compared with those of our own race.

The ancients noticed that certain defects of form were very frequent in the legs of the Egyptians, Ethiopians, and Negro slaves.

SOEMMERRING observes, that in the Negro the bones of the leg seemed pushed outwards under the femoral condyles; so that the knees appear rather further apart, and the feet are directed outwards. This is the case in both his Negro skeletons, and in more than twelve living Negroes whom he examined.* It is seen in the cast of the Negro belonging to the College Museum. The tibia and fibula are more convex in front than in Europeans.† The calves of the leg are very high, so as to encroach upon the hams. The feet and hands, but particularly the former, are flat: the os calcis, instead of being arched, is continued in nearly a straight line with the other bones of the foot, which is remarkably broad. "Both hands and feet terminate in beautiful but very long, and therefore almost ape-like, fingers and toes; and they had all sesamoid bones, which are certainly rare in Europeans."‡ "The only peculiarities," observes Winterbottom,‖ "which struck me in the black hand and foot, were the largeness of the latter, the thinness of the hand, and the flexibility of the fingers and toes." Unseemly thickness of the legs is not uncommon among the Negroes; and the feet exhibit numerous chinks and fissures, which, as they occur principally in the soles, must probably be referred to the effect of the burning sands. In the sole of a healthy Negro, who died at Cassel, Blumenbach found the epidermis "mirum in modum crassa, rimosa, et in multifidas lamellas dehiscens."§

Peculiarities of form are traceable, in some instances, to particular practices. "The only and very common defect observable among the Calmucks (says Pallas) is curvature of the thighs and legs, arising from their sitting, even in the cradle, on a kind of saddle, in a riding attitude, and being accustomed to riding as soon as they are able to go alone."¶

The curvature of the legs, which is found not only in the Negroes, but in the Hindoos,* Americans,† and in many other cases, arises from the practice of squatting; that is, of resting the body on the lower limbs, the ankles and knees being bent to the utmost. The weight of the trunk in this attitude, which is painful and indeed insupportable to those who are not accustomed to it, rests on the back of the leg; hence the form of the calf is spoiled by it.

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* *Von der Körperl. Versch.* § 42.

† Mr. White has represented the bones of the leg and foot of the Negro and European in a comparative view: *On the Regular Gradation*, pl. 1.

‡ Soemmerring, ibid

‖ *Account of the Native Africans*, v. 2. p. 257.

§ *De G. H. Var. Nat.* p. 246. note b.

¶ *Sammlungen*, &c. Th. 1. p. 98.

Smallness of the hands and feet has been remarked by careful observers in many races. Thus it has been found, when the Hindoo sabres have been brought to England, that the gripe is too small for most European hands.‡

The Chinese were amused by the largeness and length of Mr. Abel's hands. He adds, "Those of all the Chinese, when compared to the hands of Europeans, are very small. When placed in mine, which are not excessively large, wrist against wrist, the ends of their fore-fingers scarcely extended beyond the first joints of mine."‖

Mr. Chappell observes of the Eskimaux, that "the most surprising peculiarity of these people is the smallness of their hands and feet."§

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* This curvature of the leg and deficiency of the calf are represented to me by that accomplished artist Mr. Daniel, as the only faults in the Indian form; which he describes as very far exceeding that of Europeans in elegance and fine proportions.

† Chanvalon, *Voyage à la Martinique*, p. 58.

In the Pescherais of Tierra del Fuego, Forster observes that the lower limbs are by no means proportioned to the upper parts: that the thighs are thin and lean, the legs bent, the knees large, and the toes turned inwards. *Obs. made on a Voyage round the World*, p. 251.

Cook describes the Natives of Nootka Sound as having small, ill-made and crooked limbs, with large feet badly shaped, and projecting ankles. He ascribes these circumstances to their sitting so much on their hams and knees. *Voyage to the Pacific*, v. 2. p. 303.

Lewis and Clarke found broad, thick, flat feet, thick ankles, and crooked legs, in the Western-American tribes generally. They ascribe the latter deformity to the universal practice of squatting, or sitting on the calves of their legs and heels. *Travels*, ch. 23.

‡ Hodges, *Travels in India*, p. 3.

‖ *Narrative of a Journey in the Interior of China*, p. 91.

§ *Narrative of a Voyage to Hudson's Bay*, p. 59.

Humboldt says that "the Chaymas, like almost all the Native nations (of America) I have seen, have small slender hands."[*]

Similar observations have been made respecting the New Hollanders and Hottentots.[†]

I am not acquainted with any natural differences in the form or size of the ears, as characterizing the several races of men. It is well known that they stand off further from the head, and are in some degree moveable in savages; also that the lobulus is enlarged and monstrously elongated by various artificial means in many instances. These practices may have given rise to the fables of some old writers concerning the enormous ears of certain people.

In some instances, a slit is made in the external ear, parallel to and near its circumference, and extending through almost its whole length. This is not only subservient to decoration by holding ornaments, but is also converted to the convenient purpose of receiving knives or other useful articles.[‡]

The Brazilians inserted gourds in the slits of their ears, increasing the size until the first could be put through, and the ears reached the shoulders. When they prepared for battle, these ornamental appendages were fastened behind the head."[||]

Condamine and **Ulloa** saw the lobuli extended to four or five inches in length, so as to touch the shoulders in many cases. The perforations were seventeen or eighteen lines in diameter.[§]

Similar practices prevail extensively in the Asiatic and South-Sea Islands, where persons are seen with the lobuli reaching the shoulders, and having slits large enough for the hand to pass.[¶]

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[*] *Personal Narrative*, v. 3. p. 226. See also **Ulloa**, *Noticias Americanas*; v. 2; and **Morse**'s *American Geography*, v. 1.

[†] **Barrow**'s *Southern Africa*, v. 1. p. 157.

[‡] See portrait of a New-Zealander in **Hawkesworth**'s *Collection of Voyages*, v. 3. pl. 13 Also pl. 11, in the Atlas of **Cook**'s *Voyage to the Pacific*.

[||] **Southey**'s *History of Brazil*, v. 1. pp. 135, 136, and 631. note 36.

[§] *Mémoires de l'Acad. des Sciences*; 1745. p. 433.

Travels in South America, v. 1. p. 395.

A similar account is given by **Adair**, *Hist. of the North American Indians*, p. 171.

[¶] **Forster**, *Obs. on a Voyage round the World*, p. 592. A man at Tanna

I shall shortly mention here some other modes of ornamental bodily embellishment, which have been practised chiefly among tribes in a more or less rude state. The flattening of the forehead, the dyeing and filing of the teeth, have been already noticed; see CHAPTER IV. SECT. II.

The operation of tattooing, or puncturing and staining the skin, has prevailed in various degrees in most parts of the world; but it has been adopted most extensively and generally in the South-Sea Islands, where it is considered as highly ornamental. The art is carried to its greatest perfection in the Washington or New-Marquesas Islands; where wealthy and powerful individuals are often covered with various designs from head to foot.* The elegance and symmetry of the tattooed figures are as much admired by them, as those of dress are by us. We may pardon their simplicity in attaching so much value to the multiplicity and arrangement of these punctures, when we consider that those satisfactory tests of personal merit, the stars, ribbons, and orders, of which more civilized men are so justly proud, are not yet known to them. "For performing the operation, the artist uses the wing-bone of a tropic-bird (phaëton etherus), which is rendered jagged and pointed at the end like a comb, sometimes in the form of a crescent, sometimes in a straight line, and larger or smaller according to the figures he designs to make. This instrument is fixed into a bamboo handle about as thick as the finger, with which the puncturer, by means of another cane, strikes so gently and dexterously, that it scarcely pierces through the skin. The principal strokes of the figures to be tattooed are first sketched upon the body with the same dye that is afterwards rubbed into the punctures, to serve as guides in the use of the instrument.

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wore thirteen ear-rings of turtle-shell, an inch in diameter, and three quarters of an inch broad.

COOK's *Voy. towards the South Pole*, v. 1. p. 290. pl. 46 and 47, Man and Woman at Easter Island, with elongated lobuli.

* LANGSDORFF's *Voyages and Travels*, &c. v. 1. chap. 5. The designs, which are symmetrically arranged, and show no inconsiderable taste, are exhibited in two plates. at pp. 119 and 122. See also HAWKESWORTH's *Collection*, v. 3. pl. 13. for the tattooed head of a New-Zealander.

The punctures being made so that the blood and lymph ooze through the orifice, a thick dye, composed of ashes from the kernel of the burning nut (aleurites triloba) mixed with water, is rubbed in. This occasions at first a slight degree of smarting and inflammation ; it then heals, and, when the crust comes off after some days, the bluish or blackish-blue figure appears." "When once the decorations are begun, some addition is constantly made to them at intervals of from three to six months; and it is not unfrequently continued for thirty or forty years, before the whole tattooing is completed. We saw some old men of the higher ranks, who were punctured over and over to such a degree, that the outlines of each separate figure were scarcely to be distinguishd, and the body had an almost Negro-like appearance. This is, according to the general idea, the height of perfection in ornament, probably because the cost of it has been very great, and it therefore shows a person of superlative wealth.*

The color of the tattooed figures resides in the cutis or true skin; the cuticle is not affected. Contrary to what we should have inferred, from the generally-assumed principle of constant change in the component particles of animal bodies, these marks are indelible; they are neither extinguished, nor rendered fainter by lapse of time, and can be got rid of only by excision.

Another mode of ornamenting the skin by means of raised cicatrices is principally practised in Africa. WINTERBOTTOM informs us, that in the neighborhood of Sierra Leone it is peculiar to the female sex ; "that it is used upon the back, breast, abdomen, and arms, forming a variety of figures upon the skin, which appears as if embossed. The figures intended to be represented are first drawn upon the skin with a piece of stick dipped in wood-ashes, after which the line is divided by a sharp pointed knife. The wound is then healed as quick as possible, by washing it with an infusion of bullanta." "These incisions or marks are generally made during childhood, and are very common on the Gold Coast, where each nation has its peculiar mode of ornamenting themselves, so that by the disposition of the marks it is easy to know which country the person belongs to: for the most part, the females possess the greatest number of these painful ornaments.[*]

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* LANGSDORFF, p. 118—120.

In the recent voyage up to the Congo, the embossed cicatrices were found a very common ornament. Captain TUCKEY observed, on entering the river, "that all the visiters, whether Christians or idolaters, had figures raised on their skins in cicatrices."[†] As he proceeded further, he found that the "the cicatrices or ornamental marks on the bodies of both men and women were much more raised than in the lower part of the river. The women in particular had their chest and belly below the navel embossed in a manner that must have cost them infinite pain."[‡]

The septum narium is sometimes perforated, and a piece of bone or wood worn in the aperture, often of considerable magnitude.[‖] But the most singular practice is that of the women on the north-west coast of America, who make a large horizontal slit in the lower lip parallel to the opening of the lips, and penetrating into the mouth; they wear in it ornaments of different kinds, but generally oval pieces of wood a little concave on the two surfaces, and grooved at the edge. The smallest of these additional mouths, as described by VANCOUVER, was 2½ inches long: the largest $3\frac{4}{10}$ inches by 1½. Capt. DIXON brought home one of the lip-ornaments, which measured $3\frac{7}{8}$ inches by $2\frac{5}{8}$. It was inlaid with a small pearly shell, and surrounded with a rim of copper.[§]

The natives of the neighboring Fox Islands seem determined to unite all kinds of personal embellishment. "They make three incisions in the under lip; they place in the middle one a flat bone, or a small colored stone; and in each of the side ones a long pointed piece of bone, which bends and reaches almost to the ears. They likewise make a hole through the gristle of the nose, into which they put a small piece of bone in such a manner as to keep the nostrils extended. They also pierce holes in the ears, and wear in them what little ornaments they can procure."*

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[*] *Account of the Native Africans*; v. 1. p. 106, 167.

[†] *Narrative of an Expedition* &c. p. 80, 121.

[‡] Ibid. p. 182, 183. The custom is retained by the Black Caribs in the West Indies; AMIC, in *Journal de Physique*, Aug. 1791.

[‖] *Voyage*, v. p. 280.

[§] *Voyage*, p. 208. Also pp. 172, 186.

PEROUSE, *Voyage*, v. 2. p. 130 and following

LANGSDORFF'S *Voyages and Travels*, v. 2. p. 115.

The same practice exists in the Archipelago between America and Kamtschatka: COXE'S *Account of the Russian Discoveries*; 3d ed. pp. 31, 35, 104, 138, 176, 197

The barbarous Chinese custom of contracting the feet of women, and the great extent to which their irrational purpose is accomplished, are well known. While the Europeans were expressing their surprise at such an absurdity, and pitying the sufferers, they were constantly permitting under their own eyes the equally, if not more pernicious practice of tight stays; by which I have seen the figure of the thorax completely and permanently altered at its lower part.†

When the male New-Hollanders approach the age of puberty, they have one of the front incisors of the upper jaw knocked out, with a curious set of ceremonies described and delineated by Mr. Collins.‡ The women of these people, and of some others, particularly in the South Sea, are often seen to have lost one or two joints of the little finger. The exact nature and object of both these mutilations are not understood.

Many travellers have spoken of the large and pendulous mammæ of the females of certain barbarous tribes, particularly in Africa. There is no original difference in these cases; the Hottentots and Negresses, previously to child-bearing, have bosoms as finely formed as any women; but after this time the breasts become very loose and flaccid, so that they can turn them under or over the shoulder, and suckle their infants on their backs. This practice, and that of long-continued suckling, probably tend to increase the elongation.

In speaking of the Shangallas, Bruce says that "after a few days, when the child has gathered strength, the mother carries it in the same cloth upon her back, and gives it suck with her breast which she throws over her shoulder; this part being of such a length, as in some to reach almost to the knees."*

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* Coxe, p. 176, 177. A similar custom prevailed among the Brazilians; Southey, *History of Brazil*, v. 1. p. 11.

† The small-waisted damsels are placed by Linnæus among the monstrous varieties of our species; "junceæ puellæ, abdomine attenuato Europeæ."

‡ *Account of the English Colony, &c.* Appendix; with eight illustrative engravings.

Captain **Tuckey**† noticed the "pendent flaccidity of bosom" which belongs to the African women, and which is thought ornamental by the girls of the Zaire, or rather promoted by them as a token of womanhood."‡

Dr. **Somerville**|| says that the breasts of the Hottentot women at the time of puberty, "become long, round, and firm; the nipple scarcely projecting from the areola, which is more extensive than in other females. Soon after this period, and particularly during utero-gestation, the nipples increase, and do not again entirely shrink. After one or two births, the breasts are flaccid, wrinkled, and pendulous, hanging down sometimes to the groins, like bags suspended from the neck."

When the Hottentot Venus was stripped naked, ".the breasts, which she used to raise and confine by her dress, showed their large pendent masses, terminated by black areolæ of more than four inches in breadth, and marked by radiated wrinkles."§

Mr. **Barrow**, in speaking of the Namaqua Hottentots, says that "the breasts are disgustingly large and pendent: the usual way of giving suck, when the child is carried on the back, is by throwing the breast over the shoulder."¶

Ulloa** observed the Negresses in South America carrying their children on their backs, and passing the breasts to them for suckling under the arm or over the shoulder.

This fact is reported by numerous and respectable travellers; and has been confirmed to me so positively, both in the Negro

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* *Travels to the Source of the Nile*: 2d ed. v. 4 p. 35.

† *Expedition to Explore*, &c. pp. 18. 124.

‡ "Au Sénegal les jeunes filles font leurs efforts pour faire tomber leur gorge afin qu'on les croye femmes, et qu'on les respecte d'advantage." **Lamiral**. *L'Afrique* p 45.

|| *Medico-Chirurgical Transactions*. v. 7 p. 157.

§ **Cuvier**, in *Mémoires du Muséum d'Hist. Nat*. t. 3. p. 265

¶ *Travels in the Interior of Southern Africa*. v. 1 p. 390

** *Travels in South America*, v. 1 p. 32.

and Hottentot races, by eye-witnesses, that I am surprised to find it contradicted by Dr. WINTERBOTTOM; who says, "I never saw an instance where women could suckle their infants upon their backs, by throwing their breasts over their shoulders; and it may be affirmed that such a circumstance would occasion as much astonishment on the western coast of Africa as it would in Europe."*

This assertion is rather more general than could be warranted by the author's experience, which seems to have been principally confined to the Nova-Scotia Negroes, settled in Freetown, Sierra Leone. We can only infer from it, therefore, that the fullness and elongation of the breasts are not universal in the African race.

Some of the accounts, indeed, bear an evident air of exaggeration: BRUCE's expressions are rather strong: but what are we to think of the assertion that tobacco-pouches manufactured from the breasts of the Hottentot females are sold in great numbers at the Cape of Good Hope?†

On the other hand, similar conformations have been occasionally noticed in some European countries. "I saw," says LITHGOW, "in Ireland's north parts, women travayling the way or toyling at home, carry their infants about their necks, and laying the dugges over their shoulders, would give sucke to the babes behind their backes, without taking them in their armes: such kinde of breasts, me thinketh, were very fit to be made money-bags for East or West-Indian merchants, being more than halfe a yard long, and as well wrought as any tanner, in the like charge, could ever mollifie such leather."*

A large size of the breasts has been observed in the Morlachian women by FORTIS; and is alluded to by JUVENAL as a well-known circumstance, in speaking of the Egyptians:—

> "In Meroe crasso majorem infante papillam."

The Portuguese women of modern days are said to be remarkable in the same way; while the Spaniards, in the last century at least, took pains to compress these parts, in order to prevent too great a luxuriance.

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* *Account of the Native Africans*, v. 2. p. 264.

† MENTZEL, *Beschreibung des Vorgebirges der guten Hoffnung*; t. 2. p. 564

* *Rare Adventures and painful Peregrinations*, p. 433.

To the disgrace of London, even in this pious age of societies for suppressing vice and distributing Bibles, a philosophic foreigner has found in her streets a proof of the effects of too early venereal excitement in enlarging the breast; and has commemorated the fact in a classical work, which must convey the scandal over the whole learned world. "Contraria cura ambitum mammarum augeri posse nullum dubium est; quantum vero præterea Venus quoque præmatura eo conferre possit memorabili sane exemplo impuberes et nondum adultæ puellæ mercenariæ docent, quæ Londinum, præsertim ex vicinis maxime suburbiis confluunt, et quæstum corpore facientes ingenti numero plateas noctu pervagantur."*

There are no essential differences in the organs of generation: their construction and functions are the same in the various races of mankind. The Negroes, indeed, have generally been celebrated for the size of a principal member of this apparatus. "Nigritas mentulatiores esse vulgo fertur. Respondet sane huic asserto insignis apparatus genitalium Æthiopis, quem in supellectili mea anatomica servo. Num vero constans sit hæc prerogativa et nationi propria, nescio.† Two specimens in the College Museum strongly confirm the common opinion, which is also corroborated by Mr. White,‡ both from dissection and observation of living Negroes. He mentions an instance where the part in question was found, on dissection, to be twelve inches long. In the living and dead Negroes whom I have seen, there has been no deviation in size from the European formation; but I have never injected the part.

Mr. White observes that many Negroes have no frænum præputii; and that in others it is small and imperfect.‖

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* Blumenbach *de G. H. Var. Nat.* sect. iii. § 67.

† Ibid. sect. iii. p. 240.

‡ *On the Regular Gradation*, p. 61.

‖ Ibid. p. 62. Tyson states that the chimpansee had no frænum; *Anat. of pigmie*, p. 45. The exact structure of this part is not mentioned by Campe

It has been supposed that the Hottentot women have something peculiar in this part of their organization; that they are distinguished from all other daughters of Eve, by being furnished with a natural fig-leaf of skin, produced from the lower and front part of the abdomen, and covering the sinus pudoris. It has been called a natural apron (tablier, Fr.; ventrale cutaneum; schurze, Germ.) Although the native country of these females has been so much visited by Europeans from all quarters for a long series of years, and the structure, according to ordinary descriptions, must be very recognisable, there is a singular discordance among travellers concerning this interesting point in natural history. Some affirm, others altogether deny, its existence; and of the former, hardly any two agree in the precise nature of the peculiarity: some referring it to the labia, some to the nymphæ, others to a peculiar organization: some deeming it natural, others artificial.

This discordance is accounted for in great measure by two circumstances. First, that the peculiar organization is not visible in the ordinary attitude of the body, being concealed between the thighs;* and, secondly, that it is confined to a particular tribe. It does not exist in the Negroes, where the female organs of generation differ from the European only in colour, in the Kaffers, the Booshuanas, at least not in a conspicuous degree, or in the Hottentots generally; but it belongs to that particular tribe of Hottentots who are called Bosjesmen, or Boschismen.

This name which is equivalent to Bushmen, was given by the Dutch to a diminutive race strongly resembling the Hottentots in general formation. They are wild and fugitive beings, frequently engaged in rapine and plunder, and retiring for security into deserts and thickets, whence their name seems to have been derived.† Perpetual warfare subsisted between these Bushmen and the Dutch, who hunted and destroyed them with as little ceremony as the other wild game of the country. That they remained in the most savage state, and were very rarely seen in the Dutch colony, is easily understood from these circumstances.

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* The Hottentot Venus displayed her charms to the French savans at the Jardin du Roi, where "she had the complaisance to undress herself that she might be drawn naked." "On this occasion, the most remarkable peculiarity of her formation was not observed: she kept her 'tablier' carefully concealed, either between her thighs or still more deeply; and it was not known, till after death, that she possessed it." Cuvier, Mémoires du Muséum," p. 264, 265.

† Cuvier says that they were called Bushmen "parce qu'ils ont coutume de

On the authority of LE VAILLANT* and of drawings communicated to him by Sir JOSEPH BANKS, BLUMENBACH† describes the peculiarity to consist in an elongation of the labia, and represents it as produced by artificial means. More careful and accurate examinations, both in Africa and Europe, have proved most clearly, that it resides in the nymphæ, which acquire a length of some inches, and that the formation is natural.

SONNERAT had already represented the matter nearly correctly. "Le tablier fabuleux qu'on prête à leurs femmes, et qu'on dit leur avoir été donné par la nature, n'a point de réalité ; il est vrai qu'on aperçoit dans certaines une excroissance des nymphes qui quelquefois pend de six pouces, mais c'est une phénomène particulier, dont on ne peut pas faire une règle générale."‡

"The well-known story," says Mr. BARROW, "of the Hottentot women possessing an unusual appendage to those parts that are seldom exposed to view, which belonged not to the sex in general, is perfectly true with regard to the Bosjesmans. The horde we had met with possessed it to a woman; and without the least offence to modesty, there was no difficulty in satisfying curiosity. It appeared, on examination, to be an elongation of the nymphæ or interior labia, more or less extended according to the age or habit of the person. In infancy it is just apparent, and in general may be said to increase in length with age. The longest that was measured, somewhat exceeded five inches, which was in a subject of a middle age. Many were said to have them much

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se faire des especes de nids dans des touffes de broussailles." Where he heard of these human nests I cannot conjecture. Mr BARROW simply states "that they are known in the colony by the name of Bosjesmans, or men of the bushes, from the concealed manner in which they make their approaches to kill and to plunder." "Travels in South Africa." v. 1. p. 234.

* "Voyage dans l'Interieur d'Afrique," p. 371.

† "De G. H. Var. Nat." sect. iii. § 68.

‡ "Voyage dans les Indes Orientales," t. 2. p. 93.

longer. These protruded nymphæ, collapsed and pendent, appear at first view to belong to the other sex. Their color is that of livid blue, inclining to a reddish tint, not unlike the excrescence on the beak of a turkey, which indeed may serve to convey a tolerable good idea of the whole appearance, both as to color, shape and size. The interior lips or nymphæ in European subjects which are corrugated or plaited, lose entirely that part of their character, when brought out in the Hottentot, and become perfectly smooth. Though in the latter state they may possess none of those stimulating qualities, for which some anatomists have supposed nature to have formed them, they have at least the advantage of serving as a protection against violence from the other sex; it seeming next to impossible for a man to cohabit with one of these women without her consent, or even assistance.*

Mr. Barrow adds, that "the elongated nymphæ are found in all Hottentot women; only they are shorter in those of the colony, seldom exceeeding three inches, and, in many subjects, appearing merely as a projecting orifice, or an elliptical tube of an inch or less in length. In the *bastaard* (offspring of European father and Hottentot mother) it ceases to appear."† He observes again, of the Namaaquas, that "they had the same conformation of various parts of the body as the Bosjesman women and other Hottentots; in a less degree, however, than is usual in the former and more so than in those of the latter."‡

The account is fully confirmed by the accurate descriptions of Dr. Somerville,|| who speaks from ample opportunities of observation and dissection. He states, that the mons veneris is less prominent than in Europeans; and either destitute of hair, or thinly covered by a small quantity of a soft woolly nature: that the labia are very small, insomuch that they seem sometimes to be almost deficient: that the loose, pendulous, and rugous growth, which hangs from the pudendum, is a double fold, and proved by

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* "Travels into the Interior of Southern Africa," v. 1. 278, 279.

† Ibid, 280, 281.

‡ Ibid 389.

|| "Medico-Chirurgical Transactions," v. 7. p. 157.

the situation of the clitoris at the commissure of these folds, as well as by all other circumstances to be the nymphæ; and that they descend in some cases five inches* below the margin of the labia.

The description by Cuvier† of the individual publicly exhibited in London and Paris, under the name of the Hottentot Venus, agrees entirely with Dr. Somerville's account. He found the labia small; a single prominence descended between them towards the upper part; it divided into two lateral portions, which passed along the sides of the vagina to the inferior angle of the labia. The whole length was about four inches.

This formation has been often ascribed to artificial elongation. "The testimony of the people themselves," says Mr. Barrow, "who have no other idea but that the whole human race is so formed, is sufficient to contradict such a supposition; but many other proofs might be adduced to show that the assertion is without any foundation in truth. Numbers of Bosjesman women are now in the colony who were taken from their mothers when infants, and brought up by the farmers, who from the day of their captivity, have never had any intercourse whatsoever with their countrymen, nor know, except from report, to what tribe or nation they belong; yet all these have the same conformation of the parts naturally, and without any forced means."‡

Dr. Somerville observes, that if any practice of elongating the nymphæ had existed among the Hottentots, it could not have escaped his knowledge; that they do not wish to have them long, nor take any pains for that purpose. They, who have them longest, are not thought the more beautiful; nor are those slighted, in whom they are short.‖

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* In one of Blumenbach's drawings, the length is 6 1-2 inches, (Rhynland measure.) Vaillant speaks of their reaching 9 inches.

† "Mem. du Museum," t. 3 p. 266.

When Peron visited the Cape of Good Hope, he turned his attention to this subject; but his statements, as contained in the second volume of the "Voyage des Decouvertes, &c" chap. 34. published after his death, are quite erroneous.

‡ "Travels, &c" p. 279, 280

‖ "Lib cit." p. 158.

This extension of the nymphæ in the Bosjesman and Hottentot females will appear the less remarkable, when we consider that their size varies in Europeans; that they often project beyond the labia, and are of an inconvenient length. A considerable developement of these organs is more common in warm climates; and has been noticed in the Negroes, Moors, and Copts, among whom it has been the practice for females to be circumcised.* This point is even noticed by Pliny. When the Abyssinians were converted to Christianity in the sixteenth century, the Catholic missionaries thought fit to forbid circumcision, deeming it a relic of Judaism. As the taste of the men had been formed on the old practice, they did not approve this innovation, and the Catholic girls found that they should get no husbands. In this dilemma, the College of the Propaganda sent a surgeon from Rome to examine and report; and, in consequence of his statement, the Pope authorized a renewal of the ancient custom.

Although it is not immediately connected with the generative organs, I may mention here another striking peculiarity in the same women: I mean the vast masses of fat accumulated on their buttocks, and giving to them the appearance of extraordinary and unnatural appendages.

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* In the Appendix, No. I. entitled, "An Account of Circumcision as it is practised on the windward Coast of Africa," to the second volume of his very interesting Account of the Native Africans, Dr. Winterbottom informs us, that this operation is performed on the females as well as the males; and that it is equally common to both sexes in many parts of Arabia, at Bagdad, Aleppo, and Surat, in Egypt, Abyssinia, and the neighboring countries. "Among the Mahommedan nations on this part of the coast, (Sierra Leone,) the operation consists in removing the nymphæ, together with the præputium clitoridis; not the clitoris itself, as has been imagined," p. 239. Bruce, who gives a similar account of the circumcision, or, as he calls it, excision, practised in Abyssinia, refers the origin of the custom to a natural redundancy or excess of the parts on which it is performed. Dr. Winterbottom, however, asserts, that on the windward coast of Africa there is no physical reason for it; the redundancy mentioned by Bruce being more rarely met with in these countries than in Europe: "and where the custom of circumcision is unknown, which is probably over the greater part of the continent, no complaint is made on this head," p. 241.

"The great curvature of the spine inwards, and extended posteriors, are characteristic of the whole Hottentot race; but in some of the small Boşjesmans they are carried to a most extravagant degree."—"The projection of the posterior part of the body in one subject, measured five inches and a half from a line touching the spine. This protuberance consisted of fat, and, when the woman walked, had the most ridiculous appearance imaginable, every step being accompanied with a quivering and tremulous motion as if two masses of jelly were attached behind."*

The vibration of these substances at every movement was very striking in the Hottentot Venus: they were quite soft to the feel. She measured more than eighteen inches (French) across the haunches; and the projection of the hips exceeded six inches.

Dr. SOMERVILLE found, on dissection, that the size of the buttocks arose from a vast mass of fat interposed between the skin and muscles; and that it equalled four fingers breadth in thickness.† CUVIER‡ describes the protuberance to be produced by a mass of fat, traversed in various directions by strong cellular threads, and easily removed from the gluteinus. The Hottentot Venus stated that this deposition of fat does not take place until the first pregnancy; and this statement is confirmed by the testimony of Mr. BARROW.||

It seems almost superfluous to add, that the sacrum and os coccygis have the same size, figure, and direction in these as in other females; that the latter bone is not turned backwards, much less prolonged into any resemblance or even approach to a tail.

If the Negroes and Hottentots approximate in some points to the structure of the monkey kind, as they very certainly do, this particular of the elongated nymphæ is rather an instance of the opposite description: for the corresponding cutaneous folds are barely visible in the simiæ The tremulous masses of fat, with which the glutei are loaded, constitute, on the contrary, according to CUVIER,§ "a striking resemblance to those which appear in the female mandrills, baboons, &c.; and which assume,

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* BARROW, "Lib. cit." p. 281

† Ibid. p, 160.

‡ Ibid, p. 260.

|| Ibid. p. 158.

§ Ibid. p. 268.

at certain epochs of their life, a truly monstrous developement."

The most analogous animal structure, however, is that of the sheep, of which such vast and numerous flocks are reared by the pastoral tribes of Asia. In this variety, a large mass of fat covers the buttocks, occupying the place of the tail; the protuberance is smooth or naked below, and appears when viewed behind as a double hemisphere, the coccyx being just perceptible to the touch in the notch between the two. It consists merely of fat, and fluctuates in walking, when very large, like the buttocks of the Hottentots. The mass sometimes reaches the weight of thirty or forty pounds. PALLAS,* who has described this breed of sheep very well, calls it ovis steatopyga, or fat-buttocked sheep.

The peculiarity is lost by crossing the breed with other sheep; and it becomes considerably diminished, when the animals, being purchased by the Russians and conveyed to their towns, quit their native pastures, and change their mode of life.

As this fat-buttocked sheep is universally held to be a mere variety, we cannot deem the analogous structure of the Bosjesmen and Hottentots to afford any adequate ground for referring those tribes of human beings to a distinct species. The developement of the nymphæ, and the other varieties enumerated in this chapter, are merely analogous to the variations observed in corresponding points among our domestic animals.

The works of the older cosmographers, and even the narratives of comparatively recent travellers, make mention of human varieties much more remarkable than any which I have recounted.

Such are the African Blemmyes, or people without heads; the Arimaspi and Cyclops, with one eye; the Monosceli, with one leg; the giants and pigmies, the Monorchides, the Anorchides, Triorchides, Hermaphrodites,† the Cynocephali, Cynomolgi, &c.

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* "Spicilegia Zoologica," fascic. 11. p. 63, et seq.

There are breeds of sheep in Persia, Syria, Palestine, and some parts of Africa, in which the tail is not deficient, as in the ovis steatopyga, but retains its usual length, and becomes loaded with fat.

† I have considered this subject in the article "GENERATION," of Dr. REES's "Cyclopædia."

&c. which are spoken of by HERODOTUS, PLINY, POMPONIUS MELA, PTOLEMY, and many others. The proverbial license assumed by travellers, their ignorance or disposition to deceive, their carelessness in receiving or communicating facts, and the credulity and love of the marvellous in their readers, are all favourable to the production and diffusion of such stories. In proportion as distant regions become well known, such monstrosities disappear; and the progress of natural knowledge will gradually consign all these marvellous tales to oblivion. The great mass of information, which we now possess, concerning the animal creation in general, respecting the human structure and functions in particular, and their various modifications in the principal races of the species, afford us critical rules, by which the truth or falsehood of any extraordinary narratives can be easily and certainly determined. We need not waste any more time on the fabulous varieties above alluded to: yet there is one, which has found believers even in our own times: I allude to the men with tails, who, having been again and again spoken of by various authors, were defended and patronised not long ago by Lord MONBODDO. Not to mention, that the existence of a tail in man would be quite inconsistent with all the rest of his structure, and more particularly with all the arrangements both of the hard and soft parts composing or contained in the pelvis, we may observe that nearly all, who have spoken of the homines caudati, do so, not from their own observation, but from the reports or information of others. While, on the other hand, they who pretend to have had ocular testimony of the fact, mention it in such a manner, and with such circumstances, as obviously to destroy their own credit; and they differ most widely from each other, even when speaking of the same people.[*] Again, the most intelligent and accurate travellers, in discribing the same people, either make no mention of the prodigy, or else characterize it as a pure fiction. Thus, instead of finding the existence of any race of men with tails authenticated by creditable witnesses, there is no example even of a single family displaying such an anomaly, although there are well-known instances of families with six fingers on each hand.

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[*] These remarks are exemplified by BLUMENBACH in the statements, which have been published concerning the tails of the Formosans: "De. G. H. Var. Nat." sect. iii. § 76. He also succeeded in tracing to its source the engraved representation of a man with a tail, and in proving that it was originally the figure of a monkey, transmitted from one author to another, and humanized a little at each step. MARTINI, in his version of BUFFON, took a plate from the *Amœnitates* of LINNÆUS; who took it from ALDROVANDUS, who took it from

The consideration of monstrous productions belongs to pathology and physiology, rather than to the natural history of our species. I have given a description of them, with some remarks on their production, in the fifth volume of the Medico-chirurgical Transactions.

GESNER, who took it from a German description of the Holy Land "Reyss in das Gelobte Land;" Mentz, 1486, in which it represents a quadrumanous monkey, which, with other exotic animals, was seen in the journey. This quadrumanous simia had been gradually transformed, by those who successively copied the engravings, into a human two-handed being. Ibid. note, p. 271.

CHAPTER VI.

Differences of Stature,—Origin and Transmission of Varieties in Form.

No part of the natural history of man has been more confused and disgraced by fables and hyperbolical exaggeration, than the present division. Not to mention the pigmies and giants of antiquity, the bones of different large animals ascribed to human subjects of immoderate stature, even by such men as BUFFON, sufficiently prove our assertion. The accuracy of modern investigation has, however, so completely exposed the extravagance of such suppositions, that they do not require very detailed considerations.

There is no fixed law determining invariably the human stature; although there is a standard, as in other species of animals, from which the deviations, independently of disease or accident, are not very considerable in either direction. In the temperate climates of Europe, the height of the human race varies from four feet and a half to six feet. Individuals of six feet and some inches are not uncommon in this and other European countries. Occasional instances have been known, in various parts of the world, of men reaching the height of seven, eight, or even nine feet: and ancient and even modern authors speak of the human statur reaching ten, and even eighteen feet. The latter representation are grounded on large bones dug out of the earth. These, t gether with the common propensity to believe and report what is marvellous, and the notion that mankind have undergone a physical as well as moral degeneracy since their first formation, have led to a very common belief that the human stature in general is at this period less than it was in remote ages.* We are warranted in suspecting the accounts of such great elevation above the ordinary stature in the human species, by observing that nature, within the time of which we have any authentic records, exhibits no such disproportions in other species. We find, too, that the height of these giants is reduced, as we approach modern times, to what we have opportunities of observing now: so that we may probably affirm, that no sufficiently authenticated example can be adduced of a man higher than eight or nine feet.

The large bones, on which the notions, about giants have been in many instances founded, have been discovered, by the accurate examinations of modern science, to belong to extinct species of animals of the elephant and other allied kinds. Of the loose and unphilosophical manner, in which these matters have generally been inquired into, we have a specimen in the supposed bones of a barbarian king. HABICOT, an anatomist of some celebrity, in a work entitled *Gigantosteologia*, describes some huge bones found near the ruins of the castle of Chaumont in Dauphiny, in a sepulchre, over which was a grey stone, inscribed "TEUTOBOCCHUS REX." This skeleton, he says, was tweny-five feet and a half high, and ten feet broad at the shoulders. RIOLAN, in his *Gigantomachia*, disputes this measurement, and affirms that the bones belong to the elephant. In the long controversy which ensued, it never occurred to either of the learned disputants to describe or represent the bones exactly. It is surprising that BUFFON should have figured and described the fossil bones of large animals as remains of human giants, in the supplement* of his classical work. Together with others, he mentions those dug up at Lucerne in the sixteenth century, and still preserved there. BLUMENBACH found these, on the first view, to be elephants' bones. FELIX PLATER, an excellent physician and anatomist of his time, after carefully examining and measuring these bones, declared that they belonged to a human giant of seventeen feet, and had a drawing made of this skeleton, according to his opinion of its dimensions; which drawing is still preserved in the Jesuit's College at Lucerne.†

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* The notion of diminished stature and strength seems to have been just as prevalent in ancient times as at present. PLINY observes of the human height, "Cuncto mortalium generi minorem indies fieri:" vii. 16. A most alarming prospect, if it had been well founded. HOMER more than once makes a very disparaging comparison of his own degenerate cotemporaries to the powerful heroes of the Trojan war.

That men in general were taller in the early ages of the world than at present, or that examples of very tall men were then more frequent than now, has been asserted without any proof. The remains of human bones, and particularly the teeth, which are unchanged in the most ancient urns and burial-places, the mummies, and the sarcophagus of the great pyramid of Egypt, demonstrate this point clearly; and every fact which we can collect, from ancient works of art, from armor, as helmets and breast-plates, or from buildings, designed for the abode and accommodation of men, concurs in strengthening the proof. BLUMENBACH has the skull and bones of an old person taken out of a burial-place of the most remote antiquity of Denmark (ex antiquissimo tumulo Cimbrico,) and corresponding in size to the modern standard. That we cannot have degenerated in consequence of the habits of civilized society is clear, because the individuals of nations living in a way so different from us as the native Americans, Africans, and South-Sea Islanders, &c. do not exceed us in stature. Indeed, it has been generally observed of these races that they are shorter than the Europeans.

In mentioning individuals who have exceeded the ordinary height, it is necessary to confine ourselves, in order to avoid what may be fabulous or exaggerated, to instances in our own times. One of the King of Prussia's gigantic guards, a Swede, measured eight feet and a half; and a yeoman of the Duke JOHN FREDERICK, at Brunswick Hanover, was of the same height. GILLY, who was exhibited as a show, measured 8 feet (Swedish.)[*] J. H. Reichardt of Friedberg near Frankfort, was 8 feet 3 inches; his father and sister were both gigantic.[†] Several Irishmen, measuring from 7 to 8 feet and upwards, have been exhibited in this country. The individual whose skeleton is in the College Museum was 8 feet 4 inches.

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* Tom. V

† "De G. H. Var. Nat." p. 251.

A female of Stargard, named La Pierre, was 7 feet (Danish.)[‡]

Martin Salmeron, a well-proportioned Mexican giant, the son of a Mestizo by an Indian woman, measures 7 feet 3 inches and a half, and is well proportioned.[||]

Bebe, the dwarf of Stanislaus King of Poland, was 33 inches (French,) and well-proportioned. His spine became curved as he approached manhood; he grew weak, and died at twenty-three.[§]

The Polish nobleman, Borwlaski, who was well-made, clever, and skilled in languages, measured 28 Paris inches. He had a brother of 34 inches, and a sister of 21.[¶]

A Friesland peasant at twenty-six years of age had reached 29 Amsterdam inches. C. H. Stöberin, of Nüremberg, was nearly 3 feet high at twenty, well proportioned, and possessed of talents. Her parents, brothers, and sisters, were dwarfs.[**]

Of numerous other instances on record, most seem to have been diseased, and particularly rickety individuals: so that they may be classed among pathological phenomena. The men who have considerably exceeded the ordinary standard, have neither possessed those proportions in their form which we account elegant, nor has their strength by any means corresponded to their size. The head, in these cases, is below the ratio which it should bear to the body, according to what we deduce from men of ordinary stature; hence the brain must be comparatively smaller. It is a general observation, that very large men are seldom distinguished by extent or force of mental power. The dwarfs, again, are mostly ill-made; the head, in particular, is too large. There are very few instances of what we can deem healthy well-made men, with all the proper attributes of the race, which below the general standard.

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[*] "Abhandl. der Königl. Schwed. Akademie;" 1765. p. 319.

[†] Ludwig "Naturgeschichte der Menschen-Species," p. 151.

[‡] Ibid. See also Haller, "Elem Physiol." lib. 30. sect. 1. § 17.

[||] Humboldt's "Political Essay," book 2. chap. 6.

[§] Buffon, "Hist. Nat." t. 15. p. 176.

[¶] "Memoirs of the celebrated Dwarf, Jos. Borwlaski." &c. Lond. 1788.

[**] Lavater's, "Physiognom. Fragment." 4. p. 72. Ludwig "Naturgeschichte," &c. p. 154.

Some varieties of the human race exceed, and others fall short of the ordinary stature in a small degree. The source of these deviations is in the breed; they are quite independent of external influences. In all the five human varieties, some tribes and nations are conspicuous for height and strength; others for lower stature, and inferior muscular power. But in no case is the peculiarity, whether of tallness or shortness, confined to any particular temperature, climate, situation, or mode of life.

In the Caucasian variety, there are no strongly-marked deviations from the ordinary standard, in either direction. Some parts of Sweden and Switzerland, the mountains of the Tyrol and Salzburg, are rather distinguished for the tallness of their inhabitants; while the Finnish race in the north of Europe may be short in the same proportion.

The ancient Germans were remarked for their great stature: "magna corpora," is the expression of TACITUS, which is also corroborated by the testimony of CÆSAR. Large bodies and limbs, as well as undaunted courage, are the attributes assigned to them by POMPONIUS MELA; "immanes animis et corporibus." We have no data for determining their precise stature: there is however, no proof that it exceeded the tallest of the present German races, so that some of their finest and most robust men may have somewhat exceeded six feet. Modern Saxony and the Tyrol could probably furnish an equal proportion of such individuals.

The inhabitants of America exhibit more conspicuous examples both of tall and short races. ULLOA observes of the Peruvians, that men and women are generally low, but well-proportioned.*

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* "Voyage to South America," v. 1. p. 267.

Cook calls the Pecherais of Tierra del Fuego "a little, ugly, half-starved race;" and adds, "I did not see a tall person among them."[*] The Western-American tribes of Nootka Sound, near the Columbia, and further north, are described by **Cook**,[†] **Lewis**, and **Clarke**,[‡] as low in stature.

The Chaymas of South America, says **Humboldt**, "are in general, short; and they appear so particularly, when compared, I shall not say with their neighbors the Caribbees, or with the Payaguas or Guayquilits of Paraguay, equally remarkable for their stature, but with the ordinary natives of America. The common stature of a Chayma is 1. 57 met. or 4 feet 10 inches French (about 5 feet 2 inches English.) Their body is thick-set, shoulders extremely broad, and breasts flat. All their limbs are round and fleshy.[||]

He adds, in a note, that "the ordinary stature of the Guayquilits or Mbayas, who live between 20° and 22° south latitude, is, according to **Azzara**, I. 84 met. or 5 feet 8 inches French (6 feet ½ inch English.) The Payaguas, equally tall, have given their name to Payaguay or Paraguay." The same accurate observer informs us, respecting the Caribbees of Cumana, that they are distinguished by their almost gigantic size from all the other nations he has seen in the New World."[§]

Among the native tribes in the cold regions north of Canada, Mr. **Hearne**[¶] saw individuals of 6 feet 3 and 4 inches. Mr. **Bartram** found the Muscogulges and Cherokees of North America, between 31° and 35° north latitude, taller than Europeans; many being above 5 feet, and few under 5 feet 8 or 10 inches.[**]

The Patagonians,[††] or, according to their indigenous name, the uels, who occupy the south-eastern part of South America, have been the most celebrated for their colossal stature; and really seem to be the tallest race of human beings. Their height, however, has been exaggerated by some, while others have denied that it exceeded the ordinary standard. **Pigafetta**,* who accompanied **Magalhaens** on the first circumnavigation of the globe, gives them the height of 8 Spanish feet (7 feet 4 inches English. Subsequently to this period, for two centuries and a half, the narratives of European travellers are so strangely contradictory and inconsistent with each other on the subject of these Patagonians, that they afford a lesson inculcating most strongly the necessity of caution and diffidence in employing such reports.† It is sufficient for the present purpose to represent what appears the probable state of the case, after weighing and critically considering the most unexceptionable testimonies.

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[*] **Cook**'s "Voyage towards the South Pole;" v. 2. p. 183. Also **Forster**, "Obs. on a voyage round the World;" p. 250.

[†] "Voyage to the Pacific;" v. 2. pp. 301, 366.

[‡] "Travels to the Source of the Missouri," ch. 23.

[||] "Personal Narrative," v. 3. p. 222, 223.

[§] Ibid. v. 3. p 286.

[¶] "Journey to the Frozen Ocean;" p. 351, note.

[**] "Travels," p. 482.

[††] The name of Patagonians is said by **Blumenbach** to have been given to

The Patagonians seem to be a tall but not gigantic race, and to possess a remarkably muscular frame. The only individuals ever seen in Europe were brought to Spain towards the end of the sixteenth century, and seen at Seville by the classical traveller **Van Linschoton**, who says they are well-formed and large in the body. The variety in the statements of different travellers makes it difficult to assign any particular height; but we are authorized in representing it as commonly reaching 6 feet, being often 5 or 6 inches higher, and sometimes even 7 feet.

Bougainville says that none were under 5 feet 6 inches, and none over 5 feet 11 inches; which, in English measure, are about

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them by the Spaniards, because they deemed them allied to the neighboring tribes of Chonos, and from their lower limbs being covered with guanaco skins, so as to resemble the hairy legs of animals, which are called in Spanish Patas. "De G. H. Var. Nat." p. 254.

* "Viaggio a torno il Mondo," in the collection of **Ramusio**, v. 1. p. 352.

† The opposing testimonies of various Spanish, French, English, and Dutch navigators, who have spoken of the Patagonians from the time of their being first noticed by **Pigafetta** to the voyages in the last century, are brought together in the French "Histoire des Navigations aux Terres Australes;" and the statement may be seen in English, in Dr. **Hawkesworth**'s general introduction to the account of the voyages undertaken by order of his Majesty, &c. 3 vol. 4to.

5 feet 11 and 6 feet 4½ inches.[*] Commerson,[†] however, who was with him, makes some of the highest 6 feet 4 inches (6 feet 9-10 Eng.) Bougainville says that their broad shoulders, large head, and stout limbs, made them appear like giants. They were robust and well-made, with strong muscles, firm and compact flesh.

Commodore Byron says of one who appeared to be the chief of the party, "I did not measure him; but if I may judge of his height by the proportion of his stature to my own, it could not be much less than 7 feet."[‡] An Englishman of 6 feet 2 inches appeared among them as a pigmy among giants. They were large and muscular in proportion.[||]

Captain Wallis measured several of them carefully: one of them was 6 feet 7 inches; several were 6 feet 5 inches, and 6 feet 6 inches: but the stature of the greater part was from 5 feet 10 inches to 6 feet.[§] Carteret's[¶] statement coincides with this.

Falkner, who lived some time in the country, describes the great Cacique Cangapol, as 7 feet some inches high. When standing on tip-toe, he could not reach to the top of his head. He did not recollect ever to have seen an Indian above an inch or two taller then Cangapol.[**]

The stature of the Patagonians was measured with great accuracy by the Spanish officers in 1785 and 6: they found the common height to be 6½ to 7 feet; and the highest was 7 feet 1½ inch.[*]

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[*] "Voy. autour du Monde," 4to. p. 126. The crew of the Etoile had seen several, in a preceding voyage, 6 feet high (nearly 6 feet 5 English.)—Ibid.

De la Giraudais represented the least of those he saw, in 1766, as 5 feet 7 inches French, or more than 5 feet 11 inches English.

Pernetty's "Hist. of a Voyage to the Falkland Islands," p. 288. The least of those seen by Duclos Guyot were of the same size; the rest considerably taller. Ibid. p. 263.

[†] Letter to Lalande in the "Journal Encyclopédique, 1772.

[‡] Hawkesworth's "Collection of Voyages," v. 1. p. 28.

[||] Ibid. p. 32.

[§] Ibid. p. 374.

[¶] "Philosophical Transactions," v. 60. "We measured the height of many of these people: they were in general all from 6 feet to 6 feet 6 inches, although there were some who came to 6 feet 7 inches, but none above that." "Altogether they are the finest set of men I ever saw any where." p. 22, 23.

[**] "Description of Patagonia."

Falkner says that this tribe, which he calls Puelches, live inland. When we consider this fact, and that their habits are wandering, we shall not be surprised that some of those who have visited the coast have not met with them; but have found, instead of the tall Patagonians, Americans of ordinary stature, belonging to other neighboring tribes.

After surveying the tall and muscular frames of the Patagonians, Caribbees, Cherokees, and many other American tribes, what shall we think of the notion brought forward and defended by many learned men, including even a Buffon and a Robertson, that the New World is unfavorable to the formation and full developement of animal existence? The former writer asserts that the animals common to the Old and New World are smaller in the latter; that those peculiar to the New are all on a smaller scale; that those which have been domesticated in both, have degenerated in America; and that, on the whole, it exhibits fewer species. He extends the same kind of assertion and reasoning to the human species, which he describes as dwarfish, puny, and weak in body, and destitute of all mental vigor, capacity, and talent.[†] All these representations are fully and clearly refuted by Mr. Jefferson,[‡] who has displayed as much eloquence and sound reasoning in vindicating the savage nations of America from the aspersions of the great French naturalist, as he shewed energy and perseverance in asserting the liberties of his own countrymen, wisdom and firmness in fulfilling the duties of their chief magistrate. In the following remarks he has brought forward the mammoth in opposition to the learned theories; the reasoning is equally applicable to the Patagonians, Caribs, and other tribes of powerful men, which, being in actual existence, afford a safer ground of conclusion respecting the present capabilities of the climate, soil, and air of America, than those colossal remains of an extinct species, which may have belonged to a very different order of things.

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[*] "Viaje al Estrecho de Magalhaens;" Madrid, 1788. 4to. pp. 325 et seq.

[†] "Histoire Naturelle," t. 18. p. 100—156.

[‡] "Notes on Virginia, p 72—94.

"It (the Mammoth) should have sufficed to rescue the earth it inhabited, and the atmosphere it breathed, from the imputation of impotence in the conception and nourishment of animal life on a larger scale; to stifle in its birth the opinion of a writer, the most learned of all in the science of animal history, that, in the New World, living nature is much less active, much less energetic, than in the Old:—as if both sides of the globe were not warmed by the same genial sun; as if a soil of the same chemical composition was less capable of elaboration into animal nutriment in America than in the ancient continent; as if the fruits and grains from that soil and sun yielded a less rich chyle, gave less extension to the solids and fluids of the body, or produced sooner in the cartilages, membranes, and fibres, that rigidity which retains all further extension, and terminates animal growth. The truth is, that a pigmy and a Patagonian, a mouse and a mammoth, derive their dimensions from the same nutritive juices: the difference of increment depends on circumstances unsearchable to beings with our capacities. All races of animals seem to have received from their Maker certain laws of extension at the time of their formation. Their elaborative organs were formed to produce this, while proper obstacles were opposed to all further progress. Below these limits they cannot fall, nor rise above them. What intermediate station they shall take, may depend on soil, climate, food, or selection in breeding; but all the manna of heaven would never raise the mouse to the bulk of the mammoth."

Similar differences of stature to those which I have described in the American occur also in the Ethiopian variety. That of the Negroes in general does not differ essentially from our own. The Hottentots at the southern extremity of the country are the smallest of the species in Africa. The whole race is shorter than Europeans, yet not so invariably but that tall individuals sometimes occur. Thus LATROBE mentions one of six feet in height.[*]

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[*] "Journal of a Visit to South Africa," 4to. p. 282.

The Bosjesman tribe however, are remarkably short, even among the Hottentots. Two individuals seen by LICHTENSTEIN were scarcely four feet high.* Mr. BARROW says, that "in their persons they are extremely diminutive. The tallest of the men (in a horde or kraal containing 150 individuals) measured only 4 feet 9 inches, and the tallest woman 4 feet 4 inches. About 4 feet 6 inches is said to be the middle size of the men, and 4 feet that of the women. One of these that had several children measured only 3 feet 9 inches."†

To show how little the varieties of our species depend on climate, situation, or other external influences, we find the neighboring tribe to the Hottentots, the Kaffers, distinguished for height and strength. These qualities, however, are more conspicuous in the men than in the women, and the same remark holds good in other instances. LANGSDORFF was surprised at finding the Marquesan women deficient in those personal qualities which were so remarkable in the men; and could hardly suppose them to be the mothers of the very fine males whom he saw. "The Kaffer women were mostly of low stature, very strong limbed, and particularly muscular in the leg; but the good humor that constantly beamed upon their countenances made ample amends for any defect in their persons. The men, on the contrary, were the finest figures I ever beheld: they were tall, robust, and muscular; their habits of life had induced a firmness of carriage, and an open manly manner, which, added to the good-nature that overspread their features, showed them at once to be equally unconscious of fear, suspicion, and treachery. A young man about twenty, of 6 feet 10 inches high, was one of the finest figures that perhaps was ever created. He was a perfect Hercules; and a cast from his body would not have disgraced the pedestal of that deity in the Farnese palace."‡

He states in an other place, that "there is perhaps no nation on earth, taken collectively, that can produce so fine a race of men as the Kaffers: they are tall, stout, muscular, well-made, elegant figures. They are exempt, indeed, from many of those causes that, in more civilized societies, contribute to impede the growth of the body. Their diet is simple; their exercise of a salutary nature: their body is neither cramped nor encumbered by clothing; the air they breathe is pure; their rest is not disturbed by violent love, nor their minds ruffled by jealousy: they are free from those licentious appetites which proceed frequently more from a depraved imagination than a real natural want; their frame is neither shaken nor enervated by the use of intoxicating liquors, which they are not acquainted with; they eat when hungry, and sleep when nature demands it. With such a kind of life, languor and melancholy have little to do. The countenance of a Kaffer is always cheerful; and the whole of his demeanor bespeaks content and peace of mind."*

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* "Travels in Southern Africa," chap. 8.

† "Travels," v. 1. p 277.

‡ "BARROW's Southern Africa," v. 1. p. 169.

Lichtenstein† gives a similar description of this people; and mentions one individual as 7 feet high (Rhynland measure.)

The several people classed under the Mongolian variety are shorter in stature than the Europeans; but, like the nations belonging to the other varieties, they exhibit differences in this respect. The Chinese and Japanese are nearly of the same height with ourselves.

The Mongols, Calmucks, Burats, and other tribes of central Asia, are shorter. The Lewchews are a very diminutive race, the average height of the men not exceeding 5 feet 2 inches at the utmost.‡ The Laplanders and Samoiedes, in Europe: the Ostiacs, Yakuts, Tungooses, and Tschutski, in Asia; the Greenlanders and Eskimaux of America,—all, indeed, who inhabit high northern latitudes, are equally short, measuring from 4 to a little more than 5 feet;|| and they agree remarkably in other char-

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* "Barrow's Southern Africa," v. 1. p. 205.

† Ibid. ch. 16 and 18.

‡ "Macleod's Voyage of the Alceste, &c.' p. 110.

|| "Such a person as Niels Sara, at Kautokejno (in Lapland,) who measured 5 feet 8 inches may not be again found among many hundreds of them." Von Buch, "Travels," 354.

[illegible], although occupying countries so distant from each other.

It has been long ago reported, that a nation of white dwarfs, called Quimos or Kimos, exists in the interior of Madagascar; but no direct testimony on the subject has been offered to the public; and FLACOURT, who visited the island in the seventeenth century, has treated the report as fabulous.* Lately, this nation of dwarfs has been again brought forwards; COMMERSON, who accompanied BOUGAINVILLE as naturalist, and the Count DE MODAVE, governor of the French settlement at Fort Dauphin, having declared their belief in its existence.† The only fact adduced in proof of this point is, that the governor purchased a female slave, of light color, about three feet and a half high, with long arms reaching to her knees. BLUMENBACH‡ thinks it probable that this individual must have been malformed, and in a state somewhat similar to that of the Cretins of Salzburg and the Valais. Without, therefore, denying the existence of some tribe which may have given origin to the reports respecting the Quimos, we may safely conclude that no proof has yet been brought forward that any race of white long armed dwarfs exists in the island of Madagascar.

On reviewing the facts detailed in the foregoing pages, we see that although the various races of men differ from each other in stature, as well as in other points, these differences are confined within narrower limits in man than in the species of domestic animals; and consequently that they do not prove diversity of species. The pigs taken from Europe to the island of Cuba have grown to twice their original size; and the cattle of Paraguay have experienced a very remarkable increase. It is hardly necessary to mention the contrast between the small Welsh and the huge cart-horses, or the Flanders breed of those animals; or between the Scotch or Welsh, and the Holstein cattle.

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* "Histoire de la grande Ile de Madagascar." Paris, 1658.

† The statements of COMMERSON, who died at Madagascar, and of Mr. DE MODAVE, are introduced into the "Voyage à Madagascar et aux Indes Orientales," par M. l'Abbé ROCHON. Paris, 1791. A letter of COMMERSON to LALANDE is also appended to the "Voyage autour du Monde" of BOUGAINVILLE.

‡ "De G. H. Var. Nat." sect. iii. § 73.

LE GENTIL, who was in Madagascar at the same time with COMMERSON, altogether disbelieves the existence of any such dwarfish people. "Voy. dans les Mers de l'Inde, t. 2. p. 503. And SONNERAT, who saw the individual mentioned in the text, considered it merely as an individual formation; "Voyage aux Indes Orientales," t. 2. p. 57.

Perhaps the horse affords the most remarkable instance of difference in stature. Mr. PENNANT* says that "in the interior parts of Ceylon there is a small variety of this animal, not exceeding thirty inches in height, which is sometimes brought to Europe as a rarity."

The Paduan fowl is twice the size of the common poultry.

In further proof that the diversities of stature in mankind afford no sufficient argument of original specific difference, we may observe that individuals often occur in each race, differing from each other quite as widely as the generality of any two races differ. Nay, we may even see two brothers as much unlike each other in this respect as the Laplander and the Patagonian.

In endeavoring to account for the diversities of features, proportions, general form, stature, and the other particulars mentioned in the three preceding chapters, I must repeat an observation already made and exemplified in speaking of color; namely that the law of resemblance between parents and offspring, which preserves species, and maintains uniformity in the living part of creation, suffers occasional and rare exceptions; that, under certain circumstances, an offspring is produced with new properties, different from those of the progenitors; and that the most powerful of these causes is that artificial mode of life which we call the state of domestication.

A question here naturally suggests itself how this comes about? How does it happen that any circumstances in the mode of life influence the result of the generative process? The reply to this inquiry must be deferred until the internal mechanism of the animal motions shall be more completely laid open; until we are able to show how the capillaries of the mother form the germ of a new being out of materials presented by the common mass of nutritive fluid; and how the vessels of this embryo, when more advanced, fashion the nutritive supply derived from the mother into a new set of organs, and give to the whole a more or less accurate resemblance to the bodies of both parents. At present we can only note the fact, that the domestic condition produces in great abundance not only those deviations from the natural state of the organization which constitute disease, but also those departures from the ordinary course of the generative functions which lead to the production of new characters in the offspring, and thus lay the foundation of new breeds. The domestic sow produces young twice a year; the wild animal only once. The former frequently brings forth monstrous fœtuses which are unknown in the latter. Our pigs, too, are invaded by a new kind of hydatids,* dispersed through the substance of all the organs, constituting what is called the measles in pork. The creation of these must be referred to an epocha posterior to that of the species in which they are found, as they do not exist in its natural state.

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* "History of Quadrupeds," vol. 1. p, 2.

Native or congenital peculiarities of form, like those of color, are transmitted by generation. Hence we see a general similitude in persons of the same blood; and can distinguish one brother by his resemblance to another, or know a son by his likeness to the father or mother, or even to the grandfather or grandmother. All the individuals of some families are characterized by particular lines of countenance; and we frequently observe a peculiar feature continued in a family for many generations. The thick lip introduced into the Imperial house of Austria, by the marriage of the Emperor MAXIMILIAN with MARY of Burgundy, is visible in their descendants to this day, after a lapse of three centuries. HALLER observes, that his own family had been distinguished by tallness of stature for three generations, without excepting one out of numerous grandsons descended from one grandfather.†

Individuals are occasionally produced with supernumerary members on the hands or feet, or on both; and from these, whether males or females, the organic peculiarity frequently passes to their children. This does not constantly happen, because they intermarry with persons of the ordinary form; but if the six-fingered and six-toed could be matched together, and the breed could be preserved pure by excluding all who had not these additional members, there is no doubt that a permanent race might be formed constantly possessing this number of fingers and toes.

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* They are represented by BLUMENBACH, in his "Abbildungen Naturhistorischer Gegenstande;" No. 39.

† "Elem. Physiol." lib. 29. sect 2. § 8.

Pliny has mentioned examples of six-fingered persons among the Romans: such individuals received the additional name of sedigitus or sedigita. C. Horatius had two daughters with this peculiarity.* Reaumur speaks of a family in which a similar structure existed for three generations, being transmitted both in the male and female lines.† Mr. Carlisle has recorded the particulars of a family, in which he traced supernumerary toes and fingers for four generations. They were introduced by a female who had six fingers on each hand, and six toes on each foot. From her marriage with a man naturally formed were produced ten children with a supernumerary member on each limb; and an eleventh, in which the peculiarity existed in both feet and one hand, the other hand being naturally formed. The latter married a man of the ordinary formation; they had four children, of which three had one or two limbs natural, and the rest with the supernumerary parts, while the fourth had six fingers on each hand, and as many toes on each foot. The latter married a woman naturally formed, and had issue by her, eight children, four with the usual structure, and the same number with supernumerary fingers or toes. Two of them were twins, of which one was naturally formed, and the other six-fingered, and six-toed.‡

Another remarkable example of the occurrence of a singular organic peculiarity, and of its hereditary transmission, is afforded by the English family of porcupine men, who have derived that name from the greater part of the body being covered by hard dark-colored excrescences of a horny nature. The whole surface, excepting the head and face, the palms and soles, is occupied by this unnatural kind of integument. The first account of this family is found in the *Philosophical Transactions*, No. 424,* and consists of the description of a boy, named EDWARD LAMBERT, fourteen years old, born in Suffolk, and exhibited to the Royal Society in 1731, by Mr. MACHIN, one of the secretaries. "It was not easy to think of any sort of skin or natural integument that exactly resembled it. Some compared it to the bark of a tree; others thought it looked like seal-skin; others, like the skin of an elephant, or the skin about the legs of a rhinoceros; and some took it to be like a great wart, or number of warts uniting and overspreading the whole body. The bristly parts which were chiefly about the belly and flanks, looked and rustled like the bristles or quills of a hedgehog, shorn off within an inch of the skin." These productions were hard, callous, and insensible. Other children of the same parents were naturally formed.

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* "Hist. Nat." lib. xi. 99.

† "Art de faire éclorre les Oiseaux domestiques," t. 2. p. 377. et suiv.

‡ "Philos. Transact." 1814, pt. 1. p. 94.

In a subsequent account presented to the Society twenty-four years afterwards by Mr. H. BAKER, and illustrated with a figure of the hands, this man is said to continue in the same state. He was a good-looking person, and enjoyed good health: every thing connected with his excretions was natural; and he derived no inconvenience from the state of his skin, except that it would crack and bleed after very hard work. He had now been shown in London under the name of the Porcupine man. "The covering," says Mr. BAKER, "seemed most nearly to resemble an innumerable company of warts, of a dark-brown color, and a cylindrical figure, rising to a like height (an inch, at their full size), and growing as close as possible to one another, but so stiff and elastic, that when the hand is drawn over them they make a rustling noise."

They are shed annually, in the autumn or winter, and succeeded by a fresh growth, which at first are of a paler brown. "He has had the small-pox, and been twice salivated, in hopes of getting rid of this disagreeable covering; during which disorders the warts came off, and his skin appeared white and smooth, like that of other people; but on his recovery it soon became as it was before. His health at other times has been very good during his whole life." "He has had six children, all with the same rugged covering as himself; the first appearance whereof in them, as well as in him, came on in about nine weeks after the birth. Only one of them is living, a very pretty boy, eight years of age, whom I saw and examined with his father, and who is exactly in the same condition."*

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* The account is accompanied with a figure of the back of the hand, and a magnified view of the excrescences, pl. 1. p. 299.

Two brothers, John Lambert, aged twenty-two, and Richard, aged fourteen, who must have been grandsons of the original porcupine man, Edward Lambert, were shown in Germany, and had the cutaneous incrustation already described. A minute account of them was published by Dr. W. G. Tilesius,† who mentions that the wife of the elder, at the time he saw him, was in England, pregnant.

Let us suppose that the porcupine family had been exiled from human society, and been obliged to take up their abode in some solitary spot or desert island. By matching with each other, a race would have been produced, more widely different from us in external appearance than the Negro. If they had been discovered at some remote period, our philosophers would have explained to us how the soil, air, or climate, had produced so strange an organization; or would have demonstrated that they must have sprung from an originally different race; for who would acknowledge such bristly beings for brothers?

The giants collected by Frederic William I. for his regiment of Guards produced a very tall race in the town where they were quartered: in the language of Dr. Johnson, they "propagated procerity."‡

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* "Philos. Trans,". v. 49, p. 21. A representation of the hand is also given by Edwards, in his "Gleanings of Natural History," v. 1 p. 212.

† "Beschreibung und Abbildung der beiden sogenannten Stachelschweinmenschen;" Altenburg, fol. 1802, with two plates, containing several figures.

They are also described by Blumenbach, in Voigt's "Neues Magazin," v 3. part 4.

‡ The guards of the late King Frederic William of Prussia, and likewise

This resemblance of offspring to parents, in native peculiarities of structure, prevails so extensively, that those minute and in many cases imperceptible, differences of organization or vital properties, which render men disposed to particular diseases, are conveyed from father to son for age after age. This is matter of common notoriety with respect to scrofula, consumption, gout, rheumatism, insanity, and other affections of the head. There is more doubt in some other cases, as hare-lip, squinting, club-foot, hernia, aneurism, cataract, fatuity, &c.; of which, however, there are many well-authenticated examples.[*] There is an hereditary blindness in a family in North America, which has always affected some individuals for the last hundred years.[†] I have attended, at different times, for complaints of the urinary organs, a gentleman, whose father and grandfather died of stone.

In small and secluded communities, where marriages take place within what we may regard only as a more extensive family, hereditary varieties are blended, and produce one form, which prevails through the whole circle. The operation of this principciple may be clearly perceived in several small districts: it will act with more efficacy, and, consequently, be more discernable in larger collections of men, where differences of manners, religion, and language, and mutual animosities, forbid all intermarriages with surrounding people. In the course of time the individual peculiarities are lost, and a national characteristic countenance or form is established, which, if the restrictions of intercourse are rigidly adhered to, is constantly more and more strengthened. The ancient Germans, according to the description of TACITUS, were such a people; and his short, but expressive sketch of their character, most aptly confirms the preceding view: "Ipse eorum opinionibus accedo, qui Germaniæ populos nullis aliarum natio-

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those of the present monarch, who are all of an uncommon size, have been quartered at Potsdam for fifty years past. A great number of the present inhabitants of that place are of very high stature, which is more especially striking in the numerous gigantic figures of women." FORSTER's "Observations made on a Voyage round the World; p. 248—9.

[*] HALLER, "Elem Physiol." loc. cit.

[†] "New-York Medical Repository." v. 3. No. 1.

num connubiis infectos, propriam et sinceram et tantum sui similem gentem extitisse arbitrantur. Unde habitus quoque corporum, quanquam in tanto hominum numero, idem omnibus; truces et cærulei oculi, rutilæ comæ, magna corpora." *De Morib. Germ.* 4. The Gipsies afford another example of a people spread over all Europe for the last four centuries, and nearly confined in marriages, by their peculiar way of life, to their own tribe. In Transylvania, where there is a great number of them, and the race remains pure, their features can consequently be more accurately observed: in every country and climate, however, which they have inhabited, they preserve their distinctive character so perfectly, that they are recognised at a glance, and cannot be confounded with the natives. But, above all, the Jews exhibit the most striking instance of a peculiar national countenance, so strongly marked in almost every individual, that persons the least used to physiognomical observations detect it instantly, yet not easily understood or described. Religion has in this case most successfully exerted its power in preventing communion with other races; and this exclusion of intercourse with all others has preserved the Jewish countenance so completely in every soil and climate of the globe, that a miracle has been thought necessary to account for the appearance.

In what other way can we explain the difference between the English and Scotch? Would it be more reasonable to suppose that they descended from different stocks; or to ascribe the high cheek-bones of the latter to the soil or the climate?

As, on the one hand, a particular form may be perpetuated by confining the intercourse of the sexes to individuals in whom it exists: so, again, it may be changed by introducing into the breed those remarkable for any other quality. Connexions in marriage will generally be formed on the idea of human beauty in any country; an influence, this, which will gradually approximate the countenance towards one common standard. If men, in the affair of marriage, were as much under management as some animals are in the exercise of their generative functions, an absolute ruler might accomplish, in his dominions, almost any idea of the human form.

The great and noble have generally had it more in their power than others to select the beauty of nations in marriage : and thus, while, without system or design, they gratified merely their own taste, they have distinguished their order, as much by elegant proportions of person, and beautiful features, as by its prerogatives in society. "The same superiority," says COOK, "which is observable in the erees or nobles in all the other islands, is found here (Sandwich Islands.) Those, whom we saw, were, without exception, perfectly well-formed; whereas, the lower sort, besides their general inferiority, are subject to all the variety of make and figure that is seen in the populace of other countries."*

In no instances, perhaps, has the personal beauty of a people been more improved, by introducing handsome individuals to breed from, than in the Persians, of whom the nobility have, by this means, completely succeeded in washing out the stain of their Mongolian origin. "That the blood of the Persians," says CHARDIN, "is naturally gross, appears from the Guebres, who are a remnant of the ancient Persians, and are an ugly, ill-made, rough-skinned people. This is also apparent from the inhabitants of the provinces in the neighborhood of India, who are nearly as clumsy and deformed as the Guebres, because they never formed alliances with any other tribes. But, in the other parts of the kingdom, the Persian blood is now highly refined by frequent intermixtures with the Georgians and Circassians, two nations which surpass all the world in personal beauty. There is hardly a man of rank in Persia who is not born of a Georgian or Circassian mother; and even the King himself is commonly sprung on the female side, from one or other of these countries. As it is long since this mixture commenced, the Persian women have become very handsome and beautiful, though they do not rival the ladies of Georgia. The men are generally tall and erect, their complexion is ruddy and vigorous, and they have a graceful air and an engaging deportment. The mildness of the climate, joined to their temperance in living, has a great influence in improving their personal beauty. This quality they inherit not from their ancestors: for without the mixture mentioned above, the men of rank in Persia, who are descendants of the Tartars, would be extremely ugly and deformed."*

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* "Voyage to the Pacific;" book iii. chap. 6. FORSTER gives a similar representation of the Otaheiteans; "Obs. on a Voyage round the World,"

There is no one of the varieties above enumerated, which does not exist in a still greater degree in animals confessedly of the same species. What differences in the figure and proportion of parts in the various breeds of horses—in the Arabian, the Barb, and the German! How striking the contrast between the long-legged cattle of the Cape of Good Hope and the short-legged of England! The same difference is observed in swine The cattle have no horns in some breeds of England and Ireland: in Sicily, on the contrary, they have very large ones. A breed of sheep, with an extraordinary number of horns, as three, four, or five, (ovis plycerata) occurs in some northern countries; as, for instance, in Iceland, and is accounted a mere variety. The Cretan breed of the same animal (ovis strepsiceros) has long, large, and twisted horns. We may also point out the solidungular swine, with undivided hoof, as well as others with three divisions of that part; the five-toed fowl (gallus pentadactylus;) the fat-rumped sheep of Tartary and Thibet; and broad-tailed breed of the Cape, in which the tail grows so large, that it is placed on a board, supported by wheels, for the convenience of the animal; and the rumpless fowl (gallus ecaudatus) of America, and particularly Virginia, which has undoubtedly descended from the English breeed.

The common fowl, in different situations, runs into almost every conceivable variety. Some are large, some small; some tall, some dwarfish. They may have a small and single, a large complicated comb; or great tufts of feathers on the head. Some have no tail. The legs of some are yellow and naked; of others, covered with feathers. There is a breed with the feathers reversed in their direction all over the body; and another in India with white downy feathers and black skin. All these exhibit endless diversities of color.

A breed of sheep was lately produced in America, the origin and establishment of which confirm the positions already brought forwards. An ewe produced a male lamb of singular proportion and appearance. His offspring by other ewes, had, in many instances, the same characters with himself. These were, shortness of the limbs* and length of the body; so that the breed was called the otter breed, from being compared to that animal. The fore-limbs were also crooked, so as to give them in one part the appearance of an elbow; and hence the name 'ancon' (from ἀγκων) was given to this kind of sheep. They were propagated in consequence of being incapable to jump over fences. "They can neither run nor jump like other sheep. They are more infirm in their organic construction, as well as more awkward in their gait, having their fore-legs always crooked, and their feet turned inwards when they walk."

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* *Voyage en Perse*, t. 2. p. 34.

"When both parents are of the otter or ancon breed, their descendants inherit their peculiar appearance and proportions of form. I have heard but of one questionable case of a contrary nature."

"When an ancon ewe is impregnated by a common ram, the increase resembles wholly either the ewe or the ram. The increase of a common ewe, impregnated by an ancon ram, follows entirely one or the other, without blending any of the distinguishing and essential peculiarities of both."

"Frequent instances have happened where common ewes have had twins by ancon rams, when one exhibited the complete marks and features of the ewe; the other of the ram. The contrast has been rendered singularly striking, when one short-legged and one long-legged lamb, produced at a birth, have been seen sucking the dam at the same time."†

The formation of new varieties, by breeding from individuals in whom the desirable properties exist in the greatest degree, is seen much more distinctly in our domestic animals than in our own species, since the former are entirely in our power. The great object is to preserve the race pure, by selecting for propagation the animals most conspicuous for the size, color, form, proportion, or any other property we may fix on, and excluding all others. In this way we may gain sheep valuable for their fleece; or for their carcass, large or small; with thick or thin legs; just such, in short, as we choose, within certain limits.

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* Sir Everard Home found that the bone of the fore-leg in one of these sheep was larger but not so long as that of a much smaller Welsh sheep. Thomson's *Annals of Philosophy*, v. 1.

† Col. Humphreys *On a New Breed of Sheep*. *Philos. Trans.* 1813. . 1. pt

The importance of this principle is fully understood in rearing horses. The Arabian preserves the pedigree of his horse more carefully than his own; and never allows any ignoble blood to be mixed with that of his valued breeds; he attests their unsullied nobility by formal depositions and numerous witnesses.* The English breeder knows equally well that he must vary his stallions and mares according as he wishes for a cart-horse, riding-horse, or a racer; and that a mistake in this point would immediately frustrate his views. The distinguished and various excellencies, which the several English races of these useful animals have acquired, show what close attention and perseverance can accomplish in the improvement of breed.

Blood is equally important in the cock; and the introduction of an inferior individual would inevitably deteriorate the properties of the offspring.

The hereditary transmission of physical and moral qualities, so well understood and familiarly acted on in the domestic animals, is equally true of man. A superior breed of human beings could only be produced by selections and exclusions similar to those so successfully employed in rearing our more valuable animals. Yet, in the human species, where the object is of such consequence, the principle is almost entirely overlooked. Hence all the native deformities of mind and body, which spring up so plentifully in our artificial mode of life, are handed down to posterity, and tend by their multiplication and extension to degrade the race. Consequently, the more of the population in our large cities will not bear a comparison with that of savage nations, in which if imperfect or deformed individuals should survive the hardships of their first rearing, they are prevented, by the kind of aversion they inspire, from propagating their deformities. The Hottentots have become almost proverbial for ugliness; and one of their tribes, the Bosjesmen, are plainly ranked, by an acute and intelligent traveller, "among the ugliest of human beings."[*] The numerous sketches of Bosjesmen and Hottentots taken by Mr. S. Daniel, have been very kindly and politely shown to me by his brother, Mr. W. Daniel. In form, variety, and expression of countenance, they are not at all inferior to our cockneys; while in animation, in beauty, symmetry, and strength of body, in ease and elegance of attitude, they are infinitely superior.

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* "Several things concur to maintain this perfection in the horses of Arabia: such as the great care the Arabs take in preserving the breed genuine, and by permitting none but stallions of the first form to have access to the mares: this is never done but in the presence of a witness, the secretary of the emir or some public officer; he attests the fact, records the name of the horse, mare, and whole pedigree of each; and these attestations are carefully preserved, for on them depends the future price of the foal.

A copy of a public legal certificate given to the purchaser of an Arabian horse is added in a note. PENNANT'S *British Zoolgy*, v. ii. Appendix 1.

Equal attention is paid to the breed of horses by the Circassians, who distinguish the various races by marks on the buttock. To imprint the character of noble descent on a horse of common race, is a kind of forgery punished with death. PALLAS, *Travels in the Southern Provinces of the Russian Empire*; ch. xiv.

This inattention to breed is not, however, of so much consequence in the people, as in the rulers; in those to whom the destinies of nations are intrusted; on whose qualities and actions depend the present and future happiness of millions. Here, unfortunately, the evil is at its height: laws, customs, prejudices, pride, bigotry, confine them to intermarriages with each other; and thus degradation of race is added to all the pernicious influences inseparable from such exalted stations. What result should we expect, if a breeder of horses or dogs were restricted in his choice to some ten or twenty families taken at random? if he could not step out of this little circle, to select finely-formed or high-spirited individuals? How long a time would elapse before the fatal effects of this in-breeding would be conspicuous in the degeneracy of the descendants? The strongest illustration of these principles will be found in the present state of many royal houses in Europe; the evil must be progressive, if the same course of proceeding be continued.

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[*] Barrow, *Travels in South Africa;* v 1. p. 277.

I shall cite a single example to prove what will, to most persons, seem unnecessary; namely, that mental defects are propagated, as well as corporeal. "We know," says HALLER, "a very remarkable instance of two noble females, who got husbands on account of their wealth, although they were nearly idiots, and from whom this mental defect has extended for a century into several families; so that some of all their descendants still continue idiots in the fourth and even in the fifth generation."[*]

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[*] *Elem. Physiol.* lib. 29. sect. ii. § 8.

CHAPTER VII.

Differences in the Animal Economy.—Diseases.—External Senses.—Language.

There are no essential differences between the various races of the human species in the execution of the animal functions. The circumstances which have been hitherto noticed in this part of the subject, are plainly referrible, for the most part, to the effect of climate, mode of life, exercise of the organs, or other external causes, and not to any original diversity.

I have already alluded to the peculiar odour of the cutaneous secretion in the Negro (p. 265.) It is said, by those who are well acquainted with this race, to be very characteristic, and to be transmitted to the offspring, as well as their other peculiarities, in the mixed breeds. It has been also observed, that they sweat much less than Europeans.

The lice, which infest the bodies of Negroes, are darker colored and larger than those of Europeans;[*] but I believe that naturalists have not yet ascertained whether they are of the same or of different species, in the two cases.

It is hardly necessary to allude to the erroneous notion of the seminal fluid being black in Negroes; this, however, is expressly stated by **Herodotus**, but properly contradicted by **Aristotle**.

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[*] Long's *History of Jamaica.* White *on the Regular Gradation,* p. 79, note. Soemmerring *über die körperliche Verschiedenheit*, p. 8. note.

The blood and the bile have the same color and obvious external characters in the dark as in the white races. I am not aware that any comparative chemical examinations of these or the other animal fluids have been made.

Dr. **Winterbottom**[*] observed no difference between African and European women in respect to the menstrual discharge. The earlier maturity of the former seems to be simply the effect of climate: it is equally observable in the white races which occupy warm countries.

The very easy labors of Negresses, native Americans, and other women in the savage state, have been often noticed by travellers. This point is not explicable by any prerogative of physical formation; for the pelvis is rather smaller in these dark-colored races than in the European and other white people. Simple diet, constant and laborious exertion, give to these children of nature a hardiness of constitution, and exempt them from most of the ills which afflict the indolent and luxurious females of civilized societies. In the latter, however, the hard-working women of the lower classes in the country often suffer as little from childbirth as those of any other race. Analogous differences, from the like causes, may be seen in the animal kingdom. Cows kept in towns, and other animals deprived of their healthful exercise, and accustomed to unnatural food and habits, often have difficult labors, and suffer much in parturition.

Accurate observers in many parts of the world have remarked that the dark races are characterized by rareness and almost entire absence of personal deformity; all the individuals being well-made, and many exhibiting the finest models of symmetry and beauty. The mode of life will account in a great measure for this physical prerogative, which hunting, pastoral, and even agricultural tribes, enjoy over their more polished brethren of highly-civilized communities and large cities.[†] **Humboldt** considers that something is also due to natural strength of constitution. After stating the great freedom from deformity in the Peruvian Indians, in a passage which I have already quoted (see p. 209), he proceeds to observe, that "when we examine savage hunters or warriors, we are tempted to believe that they are all well made, because those who have any natural deformity either perish from fatigue, or are exposed by their parents; but the Mexican and Peruvian Indians, those of Quito and New Grenada, are agriculturists, who can only be compared with the class of European peasantry. We can have no doubt, then, that the absence of natural deformities among them is the effect of their mode of life, and of the constitution peculiar to their race. All men of very swarthy complexion, those of Mongol and American origin, and especially the Negroes, participate in the same advantage. We are inclined to believe that the Arab-European [Caucasian] race possesses a greater flexibility of organization; and that it is more easily modified by a great number of exterior causes, such as variety of aliments, climates, and habits; and consequently has a greater tendency to deviate from its original model,"*

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[*] *Account of the Native Africans*, v. 2. p. 259.

[†] Thus Dr. **Somerville** says of the Hottentots: "Huic genti, fasciarum in

I am not aware that any difference has been ascertained between the various races of man in the average length of life. Very old persons are sometimes seen among the dark as well as among the white people.

"It is by no means uncommon," says Humboldt, "to see in Mexico, in the temperate zone, half-way up the Cordillera, natives, and especially women, reach a hundred years of age. This old age is generally comfortable; for the Mexican and Peruvian Indians preserve their strength to the last. While I was at Lima, the Indian Hilario Pari died, at the village of Chiguata, four leagues distant from the town of Arequipa, at the age of 143. He remained united in marriage for 90 years to an Indian of the name of Andrea Alea Zar, who attained the age of 117. This

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infantibus, pileorum in ætate provectioribus, nullus usus. Deformitas rarissima est, nisi ex casu aliquo. Thorax amplus, corpus erectum, artus torosi et agiliores multo quam facile crediderint quibus vestitus arctior est familiaris." *Medico-Chir. Trans.* v. 7. p. 156.

* *Political Essay*, v. 1. p. 152—3.

old Peruvian went, at the age of 130, from three to four leagues daily on foot."

Mr. EDWARDS informs us that the Negroes in the West Indies often attain a great age;* and Mr. BARROW saw Hottentots more than a hundred years old.†

Although the general uniformity in structure and functions throughout the species must be expected to produce a general similarity in diseases, the obvious organic variations in the several races lead us to look for some modifications in the morbid phenomena. But the concurring influence of other causes, such as climate, diet, mode of life, and moral agencies, renders it difficult to distinguish what may be owing simply to peculiarity of organization. This discrimination can only be accomplished by a long series of patient observations on numerous individuals of each race, and under similar circumstances in different parts of the world.

In his *Treatise on Tropical Diseases*, Dr MOSELY observes that "the locked jaw appears to be a disease entirely of irritability. Negroes, who are most subject to it, whatever the cause may be, are void of sensibility to a surprising degree. They are not subject to nervous diseases. They sleep sound in every disease, nor does any mental disturbance ever keep them awake. They bear chirurgical operations much better than white people; and what would be the cause of insupportable pain to a white man, a Negro would almost disregard. I have amputated the legs of many Negroes, who have held the upper part of the limb themselves."

Negroes are so seldom affected by the yellow fever, that they have often been said not to be susceptible of it; and there have been instances in which, under a very general prevalence of the complaint, not one has fallen sick. On other occasions, some have been seized with this fever; but the number has been small, and they have recovered more easily than the whites.

If the yellow fever be a highly inflammatory affection, produced by those external causes which are peculiar to hot climates, we shall not be surprised that Negroes, who are organized for, and habituated to such climates, enjoy, when contrasted with the whites, a comparative exemption from its destructive attacks.

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* *History of the West Indies*, v. 2. p. 100, an example of a Negress a hundred and twenty years old; v. 3 p. 247, another strong and hearty at the age of ninety-five at least.

† *Travels in the Interior of Southern Africa*, v. 1. pp. 383, 398.

A singular instance is recorded, in the *Philosophical Transactions*,* of a very fatal inflammatory fever, which appeared in two islands on the coast of North America (Nantucket and Martha's Vineyard,) and was confined entirely to the Indian (American) population; not a single white person having been affected on either island. The whole number of Indians on Nantucket was 340; of these 258 had the distemper in the course of six months, and only 36 recovered. Of these who did not take the disease, 40 lived in English families, and 8 dwelt separate. In Martha's Vineyard, it went through every Indian family into which it came, not one escaping it. Of 52 persons affected, 39 died. A few individuals of mixed breed (European and Indian,) and one of Indian and Negro, had the distemper but recovered. None indeed died, but such as were entirely of Indian blood: hence it was called 'the Indian sickness.'

In three Negroes, who died of disease, SOEMMERRING found the same morbid appearances; and they were peculiar. They all perished with symptoms of consumption. Besides induration and abscess of the lungs, they had thickening of the coats of the intestines, and desposition of a steatomatous matter in them. In the first, there were caseous concretions in several parts of the abdomen; and the small intestines seemed as if covered by a layer of fat. The bronchial glands were greatly diseased. In the second, the intestinal canal and peritoneum were every where united by adhesions, and beset with rather hard yellowish-black tubercles, of various size and form; the mesenteric glands were diseased. In the third, the appearances were nearly similar; the abdominal viscera all adhering together, and covered by a kind of adipous stratum.†

I have seen similar appearances to these in the bodies of some

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* V. 54, for the year 1764; p. 386.

† *Ueber die Körperliche Verschiedenheit*; § 67, 68.

Negroes. The morbid change of the bowels, of which the coats are thickened by a black and yellow newly deposited substance, is different from any thing I have seen in Europeans.

Monkeys are carried off in these climates by consumption, and tubercular affections of the abdominal viscera. They exhibit morbid appearances analogous to those just mentioned; to which affections of the bones are often added. The general unhealthy condition of the frame in both cases would, I apprehend, be termed scrofula by nosologists: and its cause is probably the coldness of the climate, together, in the case of the animals, with confinement, impure, air, and unnatural food.

The disease called the yaws is a peculiar morbid production of Africa, and has been conveyed by the Negro slaves to the West Indies, where it seems to be communicable to Europeans.*

The dark-colored races exhibit in general a great acuteness of the external senses, which is in some instances heightened by exercise to a degree almost incredible. In the unsettled life of wandering tribes, the chief occupations are, hunting, war, and plunder. The members of the community are trained from their earliest infancy to these pursuits; and their progress in the necessary accomplishments determines not only the degree of their own personal enjoyment and security, but also their influence over others, and their rank in the association The astonishing perfection of their sight, hearing, and smelling, must be referred, I apprehend, to the constant exercise of the organs; as their capability of enduring violent or continued exertion, in performing long journeys, is the simple result of habit. Both are very interesting in a physiological view; and acquaint us with the extent of our powers, which are very imperfectly developed in the members of civilized societies.

Mr. COLLINS† has mentioned the quick-sightedness of the New-Hollanders; and another traveller has borne testimony to the same effect. "The quickness of their eye and ear is equally singular: they can hear and distinguish objects which would totally escape an European. This circumstance renders them very acceptable guides to our sportsmen in the woods, as they never fail to point out the game before any European can discover it."[*]

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* Dr. BATEMAN's *Practical Synopsis;* ord. vii. No. 9.

† *Account of the English Colony of N. S. Wales;* pp. 553, 584.

In describing a New-Zealander, who accompanied him to England, Mr. SAVAGE says, "It was worthy of remark how much his sight and hearing were superior to other persons on board the ship: the sound of a distant gun was distinctly heard, or a strange sail readily discernible, by MOYHANGEE, when no other man on board could hear or perceive them."[†]

We learn from Mr. BARROW, that the Hottentots, "by the quickness of their eye, will discover deer and other sorts of game when very far distant; and they are equally expert in watching a bee to its nest. They no sooner hear the humming of the insect, than they squat themselves on the ground, and having caught it with the eye, follow it to an incredible distance."[‡]

He relates the following anecdote of one whom he had left behind ill on a journey: "He had fallen asleep about the middle of the preceding day, and had not awakened till night. Though very dark, and unacquainted with a single step of our route, he had found us by following the track of the wagon. At this sort of business a Hottentot is uncommonly clever. There is not an animal among the numbers that range the wilds of Africa, if he be at all acquainted with it, the print of whose foot he cannot distinguish." "The print of any of his companions' feet he would single out among a thousand."[||]

Dr. SOMERVILLE confirms this statement, and refers the superiority of the Hottentots in these points to constant exercise of the organs.[§]

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[*] TURNBULL, *Voyage round the World*; 2d edition, p. 92

[†] *Some Account of New-Zealand*; p. 101.

[‡] *Travels in Southern Africa*, v. 1. p. 160.

[||] Ibid. p. 370.

[§] "Nonnulli feras venandi aut hostes effugiendi perpetua fere consuetudine, hac facultate (visus) adeo pollebant, ut in campis arenosis vestigia observare possent, ubi aliis nihil omnino appareret: hanc facultatem enim, utpote tum ad victum, tum ad salutem ipsam prorsus necessariam, assidue exercent, et sic mirum in modum acuunt." *Medico. Chir. Trans.* v. 7. p. 155-6.

In his frequent intercourse with the Nomadic tribes of Asia, **Pallas** had the best opportunities of observing their capabilities. "The Calmucks," he says, "have a fine nose, a good ear, and an extremely acute eye. On their journeys and military expeditions, they often smell out a fire or a camp, and thus procure quarters for the night, or obtain booty. Many of them can distinguish, by smelling at the hole of a fox or other animal, whether the creature be there or not. By lying flat, and putting their ear to the ground, they can catch at a great distance the noise of horses, of a flock, or of a single strayed animal. But nothing is so surprising as the perfection of their eyes, and the extraordinary distance at which they often perceive, from inconsiderable heights, small objects, such as the rising dust caused by cattle or horsemen, more particularly as the undulation of the boundless steeps or plains, and the vapors which rise from and float upon them in warm weather, render things very obscure. In the expedition which the Torgot Vicechan **Ubaschi** led against the Kubanians, the Calmuck force would certainly have missed the enemy, if a common Calmuck had not perceived, at the estimated distance of thirty versts, the smoke and dust of the hostile army, and pointed it out to other equally experienced eyes, when the commander, Colonel **Kishchinskoi**, could discern nothing with a good glass. They pursue lost or stolen cattle or game by the track for miles over deserts. Kirgises, or even Russians in the wild parts of the empire, are equally able to follow and discriminate tracks by the eye. This indeed, is not difficult on soft ground, or over snow; but it requires great practice and skill to choose the right out of several intermingled traces, to follow it over loose sand or snow, not to lose it in marshes or deep grass, but rather to judge from the direction of the grass, or from the depth of the print in snow or sand, how long it has been made."*

Representations equally surprising of the perfection of the senses are confirmed to us by the most unexceptionable authorities in the case of the North-American savages and of other wild races.

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* *Sammlungen Histor. Nachricht.* Th. 1. p. 100. 101.

The differences of language are as numerous as the other distinctions which characterize the several races of men. The various degrees of natural capacity, and of intellectual progress; the prevalence of particular faculties; the nature of surrounding circumstances; the ease or difficulty with which the different wants and desires are gratified: will produce not only peculiar characters in the nature and construction of language, but in its copiousness and developement.

In the formation of the sound, or voice, and in its utterance in an articulated form, or speech, no further varieties are observed, than the different combinations of the several organs concerned in the process will easily explain. The pronunciation of the Hottentots has generally been deemed very singular by European observers;* who compare it to the clucking of a turkey, or the harsh and broken noises produced by some other birds. They have numerous guttural sounds, produced deep in the throat, and pronounced with a peculiar clack of the tongue, which is quickly struck against and withdrawn from the teeth or palate. They combine their aspirated gutturals with hard consonants, without any intervening vowels, in a manner that Europeans cannot imitate: it is never acquired, except occasionally by the child of a colonist when accustomed to it from youth. Adelung represents that their bony palate is smaller, shorter, and less arched than in the other races; and that the tongue, particularly in the Bosjesmen, is rounder, thicker, and shorter.†

One of the most curious points in the subject of language is the continued existence in a large portion of Asia, very anciently civilized, and considerably advanced at least in the useful arts, of simply monosyllabic languages. Their words are merely radical sounds of one syllable, not admitting of inflection or composition, so that all modifications and accessory ideas must be either overlooked or imperfectly expressed by tedious and awkward circumlocution. Such are the languages of Thibet, the contiguous immense empire of China, and the neighboring countries of Ava, Pegu, Siam, Tungquin, and Cochin-china. "These extensive regions, and these only in the whole world, betray in their present language all the imperfection of the first attempts at speech. As the earliest efforts of the infant are merely sounds of one syllable, so the first adult children of Nature stammered out their meaning in the same way : the people of Thibet, China, and the neighboring southern countries, go on speaking as they learned some thousands of years ago, in the cradle of the species. There is no separation of ideas into certain classes, such as produce the distinction of the parts of speech in more perfectly-formed languages. One and the same sound signifies *joyful*, *joy*, and to *rejoice ;* and that through all persons, numbers, and tenses. No attempt is made, by affixing sounds expressive of relations or accessory notions to the simple monosyllabic root, to give richness, clearness, and harmony to the poor language. On the contrary, the mere radical ideas are set down together, and the hearer must guess at the connecting links. As there are no inflections, the cases and numbers are either not noted, or they are marked, under urgent circumstances, by circumlocution. They form plurals as children do, either by repetition, as *tree*, *tree*, or by adding the words *much* or *other ;* as *tree much*, *tree other*. *I much*, or *I other*, means *we*. *Be heaven I other Father who*, is the mode of expressing 'Our Father which art in heaven !'"* "That languages of such poverty, which merely place together the most essential ideas without connecting them, must open a wide field for ambiguity and obscurity in civil life, and be totally inapplicable to the purposes of science, is immediately apparent. Hence the people who speak them must ever remain children in understanding. However the Chinese may exert themselves, so long as they are impeded by this imperfect language, they must be unable to appropriate to themselves the sciences and arts of Europe."†

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* Barrow's and Lichtenstein's *Travels in Southern Africa*.

Similar descriptions are given by Sparmann, Thunberg, and Le Vaillant. Dr. Somerville observes the peculiarity of the Hottentot utterance, to which, he says, nothing similar is heard in any other part of the world. *Medico-Chir. Trans.* v. 7. p. 155.

† *Mithridates*; 3r. Theil; 1e. Abtheilung, p. 292—3.

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* ADELUNG ; *Mithridates*, v. 1. p. 18.

† Ibid. p. 28.

We are again surprised at discovering that this peculiar language is not connected with the peculiar organization of that variety (the Mongolian) to which the people enumerated above belong. The tribes immediately adjoining the latter on the north, —for example, the proper Mongols, the Calmucks, and the Burats,—although they have at all times occupied the regions close to Thibet, and have obviously derived their language from this quarter, are no longer confined to such an imperfect instrument of thought and communication as a monosyllabic language affords. They have inflections and derivations, both for nouns and to express times.[*] The same observations are applicable to the Mandshurs,[†] or Mantchoos.

The Japanese, too, another numerous people of Mongolian formation, have a well-formed polysyllabic language, without any resemblance to that of the Chinese.[‡]

The monosyllabic language of so large a portion of Asia appears the more remarkable, when it is contrasted with the languages of the native Americans, who, in the form of the head, approach closely to the characters of the Mongolian variety. In the capability of inflection and composition, and in the consequent length of words,[||] many of the American tongues offer a complete contrast to those of China, Thibet, &c.

America is also distinguished from the old continent by the great number of its different languages. Mr. JEFFERSON[§] states that there are twenty radical languages in America for one in Asia. "More than twenty languages are still spoken in the kingdom of Mexico, most of which are at least as different from one another as the Greek and the German, or the French and Polish. The variety of idioms spoken by the people of the new Continent, and which, without the least exaggeration, may be stated at some hundreds, offers a very striking phenomenon, particularly when we compare it to the few languages spoken in Asia and Europe.*

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[*] ADELUNG : *Mithridates*, v. 1. p. 504

[†] Ibid. p. 514.

[‡] Ibid. p. 572.

[||] HUMBOLDT informs us that *Notlazomahuiztespixcatatzin* is the term of respect used by the Mexicans in addressing the priests. *Political Essay*, v. 1. p. 139, note.

[§] *Notes on Virginia*, p. 164.

The causes of these diversities, and the relations between the form and structure of the brain, the appetites, sentiments, moral and intellectual character, of the several human races, and the genius of their languages, are important subjects for future inquiry. It will be sufficient to assert, in reference to the present subject, that no difference of language hitherto observed affords any argument against unity of the species. We can have no difficulty in arriving at this conclusion, when we find, as in America, numerous completely distinct tongues in the several families of one great, and, in all essential points, uniform race; and when we discover, moreover, so strong a contrast as that which the monosyllabic languages of Asia and the complicated long words of so many American languages present, in nations whose organic traits are so similar.

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* *Political Essay*, v. 1. p. 138.

This statement is corroborated by VATER, who observes, that " in Mexico, where the causes producing insulation of the several tribes have been for a long time in a course of diminution, CLAVIGERO recognised thirty-five different languages (*Saggio di Storia Americana*, t. iii. append. ii. c 3 p. 282. And those with which we are acquainted by written accounts are quite radically distinct, and almost unconnected with each other." *Mithridates*, th. iii. p. 373.

CHAPTER VIII.

Differences in Moral and Intellectual Qualities.

AFTER surveying and describing the diversities of bodily formation exhibited in the various races of men, and alluding to a few physiological distinctions, we naturally proceed to a review of their moral and intellectual characters, to examine whether the latter exhibit such peculiarities as the numerous modifications of physical structure lead us to expect; whether the appetites and propensities, the moral feelings and dispositions, and the capabilities of knowledge and reflection, are the same in all, or as different as the cerebral organs of which they are the functions?[*] If the physical frame and the moral and intellectual phenomena of man be entirely independent of each other, their deviations will exhibit no coincidence: the noblest characters and most distinguished endowments may be conjoined with the meanest organization: if, on the contrary, the intellectual and moral be closely linked to the physical part, if the former be the offspring and result of the latter, the varieties of both must always correspond.

The different progress of various nations in general civilization, and in the culture of the arts and sciences; the different characters and degrees of excellence in their literary productions, their varied forms of government, and many other considerations; convince us, beyond the possibility of doubt, that the races of mankind are no less characterized by diversity of mental endowments, than by those differences of organization which I have already considered. So powerful, however, has been the effect of government, laws, education, and peculiar habits, in modifying the mind and character of men, that we experience great difficulty, in distinguishing between the effects of original difference, and of the operation of these external causes.

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[*] See LECTURE IV. p. 90 and following, on the *Functions of the Brain*; SECTION I. CHAP. IV. on the *Characters of the Human Head*; CHAP. VI. on the *Structure of the Brain*; and CHAP. VII. on the *Mental Faculties of Man*.

From entering at large and minutely into this interesting subject, I am as much prevented by want of the necessary information, as by the immediate object and limited length of these Lectures. To pass it over in silence, would be omitting the most important part of the natural history of our species,—one of the most interesting views in the comparative zoology of man. I shall therefore submit a few remarks, to illustrate the point of view in which the phenomena have appeared to myself; and shall be happy if they incite any of my readers to a further prosecution of the inquiry.

The distinction of color between the white and black races is not more striking, than the preeminence of the former in moral feelings and in mental endowments. The latter, it is true, exhibit generally a great acuteness of the external senses, which in some instances is heightened by exercise to a degree nearly incredible. Yet they indulge, almost universally, in disgusting debauchery and sensuality; and display gross selfishness, indifference to the pains and pleasures of others, insensibility to beauty of form, order, and harmony, and an almost entire want of what we comprehend altogether under the expression of elevated sentiments, manly virtues, and moral feeling. The hideous savages of Van Diemen's Land, of New Holland, New Guinea, and some neighboring islands, the Negroes of Congo and some other parts, exhibit the most disgusting moral as well as physical portrait of man.

Peron describes the wretched beings, whom he found on the shores of Van Diemen's Island, and of the neighboring island, Maria, as examples of the rudest barbarism; "without chiefs properly so called, without laws or any thing like regular government, without arts of any kind, with no idea of agriculture, of the use of metals, or of the services to be derived from animals; without clothes, or fixed abode, and with no other shelter than a mere shed of bark to keep off the cold south winds; with no arms but a club and spear."*

Although these and the neighboring New Hollanders are placed in a fine climate and productive soil, they derive no other sustenance from the earth than a few fern-roots and bulbs of orchises; and are often driven by the failure of their principal resource, fish, to the most revolting food, as frogs, lizards, serpents, spiders, the larvæ of insects, and particularly a kind of large caterpillar found in groups on the branches of the eucalyptus resinifera. They are sometimes obliged to appease the cravings of hunger by the bark of trees, and by a paste made by pounding together ants, their larvæ, and fern-roots.†

Their remorseless cruelty, their unfeeling barbarity to women and children, their immoderate revenge for the most trivial affronts, their want of natural affection, are hardly redeemed by the slightest traits of goodness. When we add, that they are quite insensible to distinctions of right and wrong, destitute of religion, without any idea of a Supreme Being, and with the feeblest notion, if there be any at all, of a future state, the revolting picture is complete in all its features.‡ What an afflicting contrast does the melancholy truth of this description form to the eloquent but delusive declamations of Rousseau on the prerogatives of natural man, and his advantages over his civilized brethren!

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* *Voyage de Découvertes aux Terres Australes*; t. 1. chap. 20.

† Collins. *Account of the English Colony in New South Wales.* Appendix. See also Turnbull's *Voyage round the World*; 2d ed ch 8.

‡ Mr. Collins, who had ample opportunities of observing this race, and who seems to have contemplated them with an unprejudiced mind, says. "I am certain that they do not worship sun, moon, or stars: that, however necessary fire may be to them, it is not an object of adoration; neither have they any respect for any beast, bird, or fish I never could discover any object, either substantial or imaginary, that impelled them to the commission of good actions, or deterred them from the perpetration of what we deem crimes. There indeed existed among them some idea of a future state; but not connected in any wise

The same general character, with some softening, and some modifications, is applicable to most of the native Americans, of the Africans, and of the Mongolian nations of Asia; to the Malays, and the greater part of the inhabitants of the numerous islands scattered in the ocean between Asia and America. In the most authentic descriptions, we everywhere find proofs of astonishing insensibility to the pains and joys of others, even their nearest relations; inflexible cruelty, selfishness, and disposition to cheat; a want of all sympathetic impulses and feelings; the most brutal apathy and indolence, unless roused by the pressure of actual physical want, or stimulated by the desire of revenge and the thirst of blood. Their barbarous treatment of women, the indiscriminate and unrelenting destruction of their warfare, the infernal torments inflicted on their captives, and the horrible practice of cannibalism, fill the friend of humanity by turns with pity, indignation, and horror.

With the deep shades of this dismal picture, some brighter spots are mingled, which it is a pleasing task to select and particularize.

The inferiority of the dark to the white races is much more general and strongly marked in the powers of knowledge and reflection, the intellectual faculties,—using that expression in its most comprehensive sense,—than in moral feelings and dispositions. Many of the former, although little civilized, display an openness of heart a friendly and generous disposition, the greatest hospitality, and an observance of the point of honor accord-

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with religion; for it had no influence whatever on their lives and actions." Lib cit. p. 547. Whether they had any knowledge of right and wrong, was doubtful. They had words for good and bad, as applied to useful or hurtful objects. The sting-ray, which they never ate, was bad; the kangaroo good. Their enemies were bad; their friends good: cannibalism was bad: when our people were punished for ill-treating them, it was good. "Midnight murders, though frequently practised among them whenever revenge or passion were uppermost, they reprobated; but applauded acts of kindness and generosity, for of both these they were capable." Ibid. 549.

ing to their own notions, from which nations more advanced in knowledge might often take a lesson with advantage.

Many of the Negroes possess a natural goodness of heart and warmth of affection: even the slave dealers are acquainted with their differences in character; and fix their prices, not merely according to the bodily powers, but in proportion to the docility and good dispositions of their commodity, judging of these by the quarter from which they are procured.

Although the Americans appeared so stupid to the Spaniards, that they were with some difficulty convinced of their being men and capable of becoming Christians (for which purpose a papal bull was necessary); and although this deficiency of intellect is still attested by the more candid and impartial reports of modern travellers; the empires of Mexico and Peru show that some tribes at least were capable of higher destinies, and of considerable advancement in civilization. They were united under a regular government; they practised agriculture, and the other necessary arts of life; and were not entirely destitute of those which have some title to the name of elegant.* History and romance have shed their glories round MANCO CAPAC the first sage and lawgiver, and the succeeding Incas or Emperors of Peru; whose lives and exploits have been recorded by one of their own descendants on the female side, **Garcilasso de la Vega**, surnamed the Inca.

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* The visionary notions of Dr PAUW (*Recherches Philos. sur les Américains*), and BUFFON (*Hist. Naturelle; Homme*) concerning the imperfection and feebleness of animal life in America, too lightly adopted in many instances by ROBERTSON (*Hist. of America*), have been amply exposed and refuted, so far as the people themselves are concerned, by Count CARLI, who has proved, by the clear testimonies of the original Spanish conquerors, that the Mexicans and Peruvians defended themselves with the greatest bravery and resolution, and that they had made considerable advances in knowledge, in the arts, in general civilization, and in government, at the time of the Spanish conquest. (See his *Lettere Americane*, composing the 11th, 12th, 13th, and 14th volumes of his *Opere*, 15 t. Milano, 1786; but particularly the two first.) The two fundamental truths of religion, the existence of God, and the immortality of the soul, were recognised in Peru (*Lettere*, t. 1. l. 7.); and the knowledge of arithmetic and astronomy had been carried to a great extent (ib. t. 2. l. 1. et 2.) They had constructed considerable aqueducts, of which the remains are still to be seen, and numerous canals for irrigation, of which one is said to have been 150 leagues in length (t. 1. p. 317). They were able to extract, separate, and fuse metals, to give to copper the hardness of steel, for the fabrication of their weapons and instruments; to make mirrors of this hardened copper or of hard

In stating the moral and intellectual inferiority of the native Americans to the white races, I speak of an inferiority common to them with the other dark-colored people of the globe; and do not mean to adopt, in the smallest degree, the fanciful notions promulgated by some writers of the degeneracy of all animal nature in this vast Continent. That the quadrupeds and other animals are deficient neither in size nor vigor is now well known; and though the fables respecting the gigantic stature of the Patagonians have passed away, they still remain superior in size to any Asiatic or European race of men. There are some unconquered tribes equally conspicuous for the nobler attributes of our nature. The Araucans of Chili have successfully maintained their independence against all the attacks of the Spaniards; and are well known in Europe by the epic poem of **Ercilla**, in which these contests are celebrated. In the interesting portrait which **Molina** has lately drawn of their character, manners, customs, government, and history, we recognize in many points a strong resemblance to the ancient Germans, and a pleasing proof that all the natives of this new world are not doomed to mental inferiority.

"The moral qualities of the Araucans," says **Molina**, "are

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stone; to form images of gold and silver hollow within; to cut the hardest precious stones with the greatest nicety; to manufacture and dye cotton and wool, and work and figure the stuffs in various ways; to spin and weave the fine hair of hares and rabbits into fabrics resembling and answering the purposes of silks (ibid. t. 1.)

The preceding statements are fully corroborated by the existing remains of these ancient arts as seen and described by **Ulloa**, **Bouguer**, **Condamine**, and **Humboldt**. *Travels in South America*, v. 1. book 6. chap. ii. *Acad. des Sciences*; 1740, 1745. *Vues des Cordilleres*, *Monumens des Peuples*, *&c.*)

"The Toultees," says the latter author, "introduced the cultivation of maize and cotton; they built cities, made roads, and constructed those great pyramids, which are yet admired, and of which the faces are very accurately laid out. They knew the use of hieroglyphical paintings; they could found metal and cut the hardest stones; and they had a solar year, more perfect than that of the Greeks and Romans. *Political Essay*, book 2, ch. 6.

proportioned to their physical endowments; they are intrepid, [illegible]imated, ardent, patient in enduring fatigue, ever ready to sacri[illegible]ce their lives in the service of their country; enthusiastic lovers of liberty, which they consider as an essential constituent of their existence; jealous of their honor; courteous, hospitable, faithful to their engagements, grateful for services rendered them, and generous and humane towards the vanquished."[*]

The ninety[†] years' struggle which they maintained against the Spaniards, and by which they at last successfully established their independence, is more remarkable for its duration, for acts of desperate resolution and devotion to the great cause of liberty, and traits of individual heroism, than the contests between the Dutch and the Spaniards, the Swiss and the Austrians, or any ancient or modern analogous European case.

In the savage tribes of North America we often meet with lofty sentiments of independence, ardent courage, and devoted friendship, which would sustain a comparison with the most splendid similar examples in the more highly gifted races. Honorable and punctual fulfilment of treaties and compacts, patient endurance of toil, hunger, cold, and all kinds of hardships and privations, inflexible fortitude, and unshaken perseverance in avenging insults or injuries according to their own peculiar customs and feelings, show that they are not destitute of the more valuable moral qualities.[‡]

The Mongolian people differ very much in their docility and moral character. While the empires of China and Japan prove that this race is susceptible of civilization, and of great advancement in the useful and even elegant arts of life, and exhibit the singular phenomenon of political and social institutions between two and three thousand years older than the Christian era, the fact of their having continued nearly stationary for so many centuries, marks an inferiority of nature, and a limited capacity, in comparison to that of the white races.

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[*] *Civil History of Chili*, p 59. Their strict integrity, and high sense of honor in commercial dealings, are confirmed by the testimony of ULLOA: *Travels in South America*, v. 2. p. 276.

[†] Ibid, p 291.

[‡] See Mr JEFFERSON's eloquent vindication of the North-American savages from the degrading picture drawn of them by BUFFON. *Notes on Virginia*.

When the Mongolian tribes of central Asia have been united under one leader, war and desolation have been the objects of the association. Unrelenting slaughter, without distinction of condition, age, or sex, and universal destruction, have marked the progress of their conquests, unattended with any changes or institutions capable of benefiting the human race, unmingled with any acts of generosity, and kindness to the vanquished, or the slightest symptoms of regard to the rights and liberties of mankind. The progress of ATTILA, ZINGIS, and TAMERLANE, like the deluge, the tornado, and the hurricane, involved every thing in one sweeping ruin.

In all the points which have been just considered, the white races present a complete contrast to the dark-colored inhabitants of the globe. While the latter cover more than half the earth's surface, plunged into a state of barbarism in which the higher attributes of human nature seldom make their appearance, strangers to all the conveniences and pleasures of advanced social life, and deeming themselves happy in escaping the immediate perils of famine; the former, at least in this quarter of the world, either never have been in so low a condition, or, by means of their higher endowments, have so quickly raised themselves from it, that we have no record of their existence as mere hunting or fishing tribes. In the oldest documents and traditions, which deserve any confidence, these nobler people are seen at least in the pastoral state, and in the exercise of agriculture; the practice of which is so ancient, that the remotest and the darkest accounts have not preserved the name of the discoverer, or the date of its introduction. No European people, therefore, has been in a condition comparable to that of the present dark-colored races, within the reach of any history or tradition.

The invention of arts and sciences in the East, and their surprising progress in Europe, are due to the white men. The comparatively rational system of Heathenism contained in the Grecian mythology, with its elegant fables and allegories; and the three religions, which exhibit the only worthy views of the Divinity, that is, Judaism, Christianity, and Mahomedanism; all derive their birth from the same quarter.

The Caucasian variety claims also the Persian ZOROASTER; and, if I mistake not, the founders of the religion of BRAMAH, who in the peninsula of India had signalized themselves by great advances in art and science in the very remotest antiquity.

In the white races, we meet in full perfection, with true bravery, love of liberty, and other passions and virtues of great souls; here only do these noble feelings exist in full intensity, while they are, at the same time, directed by superior knowledge and reflection to the accomplishment of the grandest purposes. They alone have been as generous and mild towards the weak and the vanquished, as terrible to their enemies; and have treated females with kindness, attention, and deference. Here alone are compassion and benevolence fully developed; the feeling for the pains and distresses of others, and the active attempt to relieve them; which, first exerted on our nearest connections, is extended to our countrymen in general, and embraces ultimately, in its wishes and exertions, the interest of all mankind.

The white nations alone have enjoyed free governments; that is, not the lawless dominion of mere force, as in many barbarous tribes, but institutions recognizing the equality of all in political rights, giving protection to the weak against the powerful, securing to all equal freedom of opinion and conscience, and administered according to laws framed with the consent of all. The spirit of liberty, the unconquerable energy of independence, the generous glow of patriotism, have been known chiefly to those nobler organizations, in which the cerebral hemispheres have received their full developement. The republics of Greece and Rome, of Italy in the middle ages, of Switzerland and Holland, the limited monarchy of England, and the United States of America, have shown us what the human race can effect, when animated by these sacred feelings; without which nothing has been achieved truly great, or permanently interesting. This is the charm that attaches us to the history, the laws, the institutions, the literature of the free states of antiquity, and that enables us to study again and again with fresh pleasure the lives and actions of their illustrious citizens.

Even the more absolute forms of government have been conducted among the white races, with a respect to human nature, with a regard to law and to private rights, quite unknown to the pure despotisms, which seem to be the natural destiny of our dark brethren. The monstrous faith of millions made for one has never been doubted or questioned in all the extensive regions occupied by human races, with the anterior and superior parts of the cranium flattened and compressed.

That these diversities are the offspring of natural differences, and not produced by external causes, is proved by their universality, whether in respect to time, place, or external influence.

Some have found a convenient and ready solution in climate; but have not condescended to show, either by example or reasoning, how climate can operate on the moral feelings and intellect, or that it has actually so operated in any instance The native Americans are spread over that vast continent, from the icy shores of the Arctic Ocean to the neighborhood of the Antarctic Circle; the Africans have a tolerably wide range in their quarter of the globe; the Mongolian tribes cover a tract including every variety of climate, from the coldest to the most warm. Yet, in such diversities of situation, the respective races exhibit only modifications of character. White people have distinguished themselves in all climates; every where preserving their superiority. Two centuries have not assimilated the Anglo-Americans to the Indian aborigines, nor prevented them from establishing in America the freest government in the world. A WASHINGTON and a FRANKLIN prove that the noble qualities of the race have suffered no degeneracy by crossing the Atlantic.

Accurate observers have found the hypothesis of climate equally unsatisfactory in other parts of the world. "The philosophy which refers exclusively to the physical influence of climate, this most remarkable phenomenon of the moral world, is altogether insufficient to satisfy the rational inquirer; the holy spirit of liberty was cherished in Greece and its Syrian colonies, by the same sun which warms the gross and ferocious superstition of the Mahomedan zealot; the conquerors of half the world issued from the scorching deserts of Arabia, and obtained some of their earliest triumphs over one of the most gallant nations of Europe (Spain.)

"A remnant of the disciples of ZOROASTER, flying from Mahomedan persecution, carried with them to the western coast of India the religion, the hardy habits, and athletic forms of the north of Persia; and their posterity may at this day be contemplated in the Parsees of the English settlement at Bombay, with mental and bodily powers absolutely unimpaired after the residence of a thousand years in that burning climate. Even the passive but ill-understood character of the Hindoos, exhibiting few and unimportant shades of distinction, whether placed under the snows of Imans, or the vertical sun of the torrid zone, has, in every part of these diversified climates, been occasionally roused to achievements of valor, and deeds of desperation, not surpassed in the heroic ages of the western world. The reflections naturally arising from these facts are obviously sufficient to extinguish a flimsy and superficial hypothesis, which would measure the human mind by the scale of a FAHRENHEIT's thermometer."[*]

White nations have kept up their character under every form of government. Science and literature have flourished in monarchies as well as in republics. Yet, let us never forget, that the principal and the richest portion of our intellectual treasure consists of the literature and history of two nations of antiquity, whose astonishing superiority seems to have arisen principally from their having enjoyed freedom.

The white nations may degenerate, as in the case of the Greeks and Romans; but the qualities which distinguished them in their proudest state are still visible. The senate, the forum, and the capitol, which were trodden by Scipios, Brutuses, and Catos, by Pompey, Cæsar, and Cicero, by Virgil, Horace, Livy, and Tacitus, have been long defiled by a vermin of priests and monks, of eunuchs and singers: the processions and fooleries of a despicable superstition have succeeded to the three hundred and twenty triumphs which gave to a small spot in Italy the command of the world, proclaiming conquests generally as beneficial to the conquered as glorious to the victors. Italy altogether has groaned for centuries under the domestic fetters of monkery and priestcraft, and the still more galling yoke of foreign rule: yet the classic ground has ever produced, and still continues to produce, men worthy of the race that realized and long maintained universal empire. What other people has sent forth, within the same period, or even in any wider range, men equal in force of genius and variety of excellence to the immortal names which Italy can boast even in her degradation;—to Dante, Petrarca, and Boccaccio; to Tasso, Ariosto Metastasio, Alfieri; to Galileo, Gassendi, and Torricelli; to Machiavel, Davila, Bentivoglio, and Guicciardini; to Raphael, Michael Angelo, and a whole host of others?

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[*] WILKS. "Historical Sketches of the South of India." v 1 p. 22. 28.

The prerogatives of the white races may be equally distinguished in the least-advanced state of civilization. Compare the ancient Germans, as delineated by Tacitus, and Cæsar, with the savages of New Holland, with a horde of Hottentots, with a tribe of American Indians: compare the ancient Spaniards or Scandinavians, the Highland Scotch, or any Celtic people, to the African, American, or Mongolian tribes.

A fair comparative experiment has been made of the white and red races in North America; and no trial in natural philosophy has had a more unequivocal and convincing result. The copper-colored natives, although in all their original independence, have not advanced a single step in three hundred years; neither example nor persuasion has induced them, except in very small number, and few instances, to exchange the precarious supplies of the hunting and fishing state for agriculture and the other arts of settled life. A little ingenuity is manifested in making clothes, ornaments, arms; and personal endurance of exertion, fatigue, and the cruelest torture, is carried to a great height. Even in war, in their eyes the first and most exalted of occupations, they show few traces of generous or honorable feelings. Bitter revenge and utter destruction are the motive and end. It is hardly necessary to draw the contrast. No Englishman can be ignorant of the mighty empire founded by a handful of his countrymen in the wilds of America;—of its gigantic strides, from the state of an insignificant colony, within forty short years of independence, to the rank of a first-rate power. No friend of humanity can be a stranger to the glorious prospect, to the energies of freedom, which vivify this new country. No human being, who is interested in the progress of his species, can refuse his tribute of admiration to this new world, which has established itself without the prejudices of the old; where religion is in all its fervor, without needing an alliance with the state to maintain it: where the law commands by the respect which it inspires, without being enforced by any military power.

The superiority of the whites is universally felt and readily acknowledged by the other races. The most intelligent Negro, whom Mr. PARK[*] met with, after witnessing only such evidences of European skill and knowledge as the English settlement of Pisania afforded, and being acquainted with two or three Englishmen, would sometimes appear pensive, and exclaim with an involuntary sigh, "Black men are nothing!" The narratives of travellers abound with similar traits. This consciousness best explains the fact of the Negroes generally submitting quietly to their state of slavery in the European colonies. If the relations and the proportions of the population were reversed, and the European slaves were five, six, eight, or ten times as numerous as their Negro masters, how long would such a state of things last? When the blacks form any plots, although their natural apathy and unvarying countenance are favorable to concealment, they always fail, through treachery or precipitation, in commencing operations, or are disconcerted by any resolute opposition, even from very inferior numbers.

Some will probably explain in a different manner these remarkable phenomena of the moral and intellectual world which I have just been considering; they will attempt to prove that these strongly-marked varieties may have been produced, in races formed originally with equal capabilities, by the external influences of civilization, education, government, religion, and perhaps other causes. To assert uniformity of bodily structure over the whole world would be too repugnant to the testimony of the senses: equality of mental endowments seems to be hardly a less extravagant tenet. There have, however, been philosophers who even held that all men are born with equal powers; and that education and other accidental circumstances make the only difference between the wisest and the weakest of mankind.

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[*] "Travels into the Interior Districts of Africa;" 8vo. ed. p. 536.

That civilization, government, and education act very powerfully on the human race, is too obvious to be doubted; but the question relates to the capability of civilization. Why have the white races invariably, and without one exception, raised themselves to at least some considerable height in the scale of cultivation; while the dark, on the contrary, have almost all universally continued in the savage or barbarous state? If we suppose that, at any remote era, all mankind, in all quarters of the globe, were in the latter condition, what are the accidental circumstances which have prevented all the colored varieties of man from raising themselves, and at the same time have assisted the progress of all the others? If the nations in the north and west of Europe, when first conquered by the Romans, should be allowed (contrary, however, to historical proof) to have been in a state of barbarism not superior to that of the present rude tribes of Asia, Africa, or America, why have they advanced uninterruptedly to their present exalted pitch of culture, while the latter remain plunged in their original rudeness and ignorance?

I do not mean to assert that all individuals and all tribes of dark-colored men are inferior in moral and intellectual endowments to all those of the white division. The same gradations and modifications of structure and properties exist here as in other parts. Certainly we can produce examples enough in Europe of beings not superior to Hottentots and New-Hollanders; and individuals of considerable talents and knowledge are met with in savage tribes. There may not be much difference between the lowest European community and the highest in some dark variety of man. Examples of individuals and of small numbers will therefore prove little in this matter.

I am aware also that all the white races have not made those signal advances in knowledge and civilization, of which I have spoken as indicating their superior endowments. Their organization makes them capable of such distinctions, if circumstances are favorable, or rather if no obstacles exist. In the dark races, on the contrary, inferior organization renders it vain to present opportunities, or to remove difficulties.

Loss of liberty, bad government, oppressive laws, neglected education, bigotry, fanaticism and intolerance in religion, will counteract the noblest gifts of nature, will plunge into ignorance, degradation and weakness, nations capable of the highest culture, of the most splendid moral and intellectual achievements. Greece, Italy, and Spain bear melancholy testimony to this afflicting truth. Where are the brave republican Dutch, who first sustained a forty-years' contest with Spain in the zenith of her power, when she could alarm all Europe by her ambitious schemes; and who then contended with England for the dominion of the sea? What causes the present feebleness of Turkey, whose very name is deemed almost synonymous with despotism and ignorance? Careful observers can discern even in these victims of oppression and fanaticism, the germs of all the higher qualifications of our race, the evidences of those moral excellencies and intellectual powers, which require only a favorable opportunity to display themselves. It is generally allowed that the Turks are superior in natural qualifications to their conquerors the Russians, who enjoy over them the advantages of a government and religion* more favorable to the progress of knowledge and to individual security and happiness.

Such are the results, deducible from experience, respecting the differences of moral feelings and intellectual power: having stated them strongly, I am anxious to express my decided opinion that these differences are not sufficient in any instance to warrant us in referring a particular race to an originally different species. They are not greater in kind or degree than those which we see in many animals; as in horses, asses, mules, dogs, and cocks. I protest especially against the opinion, which either denies to the Africans the enjoyment of reason, or ascribes to the whole race propensities so vicious, malignant, and treacherous, as would degrade them even below the level of the brute. It can be proved most clearly, and the preceding observations are sufficient for this purpose, that there is no circumstance of bodily structure so peculiar to the Negro, as not to be found also in other far distant nations; no character, which does not run into those of other races by the same insensible gradations as those which connect together all the varieties of mankind. I deem the moral and intellectual character of the Negro inferior, and decidedly so, to that of the European; and, as this inferiority arises from a corresponding difference of organization, I must regard it as his natural destiny: but I do not consider him more inferior than the other dark races. I can neither admit the reasoning nor perceive the humanity of those who, after tearing the African from his native soil, carrying him to the West Indies, and dooming him there to perpetual slavery and labor, complain that his understanding shows no signs of improvement, and that his temper and disposition are incorrigibly perverse, faithless, and treacherous. Let us, however, observe him in a somewhat more favorable state than in those dreadful receptacles of human misery, the crowded decks of the slave-ship, or in the less openly shocking, but constrained and extorted, and therefore painful labors of the sugar plantation.

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* The unfavorable influence of the Mahomedan religion on intellectual culture has been exemplified by Mr FOURIER in the case of the Arabs. "If the Arabians, like the people of the West, had possessed the inestimable advantage of a religion favorable to the arts and to useful knowledge, they would have cultivated and brought to perfection every branch of philosophy. At the commencement of their extraordinary career, they were ingenious and polished; they made remarkable progress in poetry, architecture, medicine, geometry, natural history, and astronomy; they preserved and transmitted to us many of those immortal works which were destined to aid the revival of learning in Europe. But the Mussulman religion was incompatible with this developement of the mind: the Arabs were exposed to the alternative of renouncing their faith, or returning to the ignorance of their ancestors." "Description de l'Egypte, Préface historique," p. 16.

That the Negroes behave to others according to the treatment they receive, may be easily gathered from the best sources of information. They have not, indeed, reached that sublime height, the *beau idéal* of morality, the returning good for evil, probably because their masters have not yet found leisure enough from the pursuit of riches to instil into them the true spirit of Christianity. "The feelings of the Negroes (says an accurate observer) are extremely acute. According to the manner in which they are treated, they are gay or melancholy, laborious or slothful, friends or enemies. When well fed, and not maltreated, they are contented, joyous, ready for every enjoyment; and the satisfaction of their mind is painted in their countenance. But, when oppressed and abused, they grow peevish, and often die of melancholy. Of benefits and abuse they are extremely sensible; and against those who injure them they bear a mortal hatred. On the other hand, when they contract an affection to a master, there is no office, however hazardous, which they will not boldly execute, to demonstrate their zeal and attachment. They are naturally affectionate, and have an ardent love for their children, friends, and countrymen. The little they possess they freely distribute among the necessitous, without any other motive than that of pure compassion for the indigent,"*

The travels of BARROW, LE VAILLANT, and MUNGO PARK, abound with anecdotes honorable to the moral character of the Africans, and proving that they betray no deficiency in the amiable qualities of the heart. One of these gives us an interesting portrait of the chief of a tribe: "His countenance was strongly marked with the habit of reflection: vigorous in his mental and amiable in his personal qualities, GAIKA was at once the friend and ruler of a happy people, who universally pronounced his name with transport, and blessed his abode as the seat of felicity." Some European kings might take a lesson from this savage.

Mr. BARROW gives a picture, by no means unpleasing, of the Hottentots. Their indolence probably arises from the state of subjection in which they live; as the wild Bosjesmen are particularly active and cheerful.

"They are a mild, quiet, and timid people; perfectly harmless, honest, faithful: and, though extremely phlegmatic, they are kind and affectionate to each other, and not incapable of strong attachments. A Hottentot would share his last morsel with his companions. They have little of that kind of art or cunning that savages generally possess. If accused of crimes, of which they have been guilty, they generally divulge the truth. They seldom quarrel among themselves, or make use of provoking language, Though naturally fearful, they will run into the face of danger if led on by their superiors. They suffer pain with patience. They are by no means deficient in talent."*

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* "Histoire des Antilles," p. 483.

"The Bosjesman, though in every respect a Hottentot, yet in his turn of mind differs very widely from those that live in the colony. In his disposition he is lively and cheerful; and, in his person active. His talents are far above mediocrity; and, averse to idleness, they are seldom without employment."† They are very fond of dancing, exhibit great industry and acuteness in their contrivances for catching game, and considerable mechanical skill in forming their baskets, mats, nets, arrows, &c. &c.‡

I see no reason to doubt that the Negro race, taken all together, is equal to any in natural goodness of heart. It is consonant to our general experience of mankind, that the latter quality should be deadened or completely extinguished in the slave-ship or plantation; indeed, it is as little creditable to the heads as to to the hearts of their white masters to expect affection and fidelity from slaves after the treatment they too often experience.

The acute and accurate BARBOT, in his large work on Guinea, says, "The blacks have sufficient sense and understanding, their conceptions are quick and accurate, and their memory possesses extraordinary strength: for, although they can neither read nor write, they never fall into confusion or error in the great hurry of business and traffic. Their experience of the knavery of Europeans has put them completely on their guard in transactions of exchange; they carefully examine all our goods, piece by piece, to ascertain if their quality and measure are correctly stated; and show as much sagacity and clearness in all these transactions, as any European tradesman could do."

Of those imitative arts, in which perfection can be attained only in an improved state of society, it is natural to suppose that the Negroes can have little knowledge; but the fabric and colors of the Guinea cloths are proofs of their native ingenuity; and that they are capable of learning all kinds of the more delicate manual labors, is proved by the fact, that nine-tenths of the artificers in the West Indies are Negroes. Many are expert carpenters, and some watchmakers.

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* "Travels in Southern Africa," v. 1. p. 152.

† Ibid. p. 283.

‡ Ibid. p. 284—290.

The drawings and busts executed by the wild Bosjesmen in the neighborhood of the Cape are praised by Barrow* for their accuracy of outline and correctness of proportion.

Negroes have been known to earn so much in America by their musical exertions, as to purchase their freedom with large sums. The younger Freidig in Vienna was an expert performer, both on the violin and violoncello; he was also a capital draftsman, and had made an excellent painting of himself. Mr. Edwards,† however, speaks very contemptuously of their musical talents in general: he says, "they prefer a loud and long-continued noise to the finest harmony; and frequently consume the whole night in beating on a board with a stick."

The capacity of the Negroes for the mathematical and physical sciences is proved by Hannibal, a colonel in the Russian artillery, and Lislet of the Isle of France, who was named a corresponding member of the French Academy of Sciences, on account of his excellent meteorological observations. Fuller, of Maryland, was an extraordinary example of quickness in reckoning. Being asked in a company, for the purpose of trying his powers, how many seconds a person had lived who was seventy years and some months old, he gave the answer in a minute and a half. On reckoning it up after him, a different result was obtained: "Have not you forgotten the leap-years?" says the Negro. This omission was supplied, and the the number then agreed with his answer.‡

Boerhaave and De Haen have given the the strongest testimony that our black brethren possess no mean insight into practical medicine; and several have been known as very dexterous surgeons. A Negress at Yverdun is mentioned by Blumenbach as a celebrated midwife of real knowledge, and an experinced hand.

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* "Travels," &c v. 1. p. 239, 307.

† "Hist. of the West Indies," v. 2. p. 102.

‡ Stedman's "Surinam;" v 2. p. 270. The circumstance is related on the authority of Dr. Rush, as having happened in his presence.

Omitting Madocks, a Methodist preacher, and not attempting to enumerate all the Negroes who have written poems, I may mention that Blumenbach possesses English, Dutch, and Latin poetry, by different Negroes.

In 1734. A. W. Amo, an African from the coast of Guinea, took the degree of Doctor at the University of Wittenberg; and displayed, according to Blumenbach, in two disputations, extensive and well-digested reading in the physiological books of the time.*

Jac. Eliz. Joh. Capitein, who was bought by a slave-dealer when eight years old, studied theology at Leyden, and published several sermons and poems. His *Dissertatio de Servitute Libertati Christianæ non contraria* went through four editions very quickly. He was ordained in Amsterdam; and went to Elmina on the Gold Coast, where he was either murdered, or exchanged for the life and faith of his countrymen those he had learned in Europe.†

Ignatius Sancho, and Gustavus Vasa,—the former born in a slave-ship on its passage from Guinea to the West Indies, and the latter in the kingdom of Benin,—have distinguished themselves as literary characters in this country, in modern times. Their works and lives are so well known, and so easily accessible, that it is only necessary to mention them.

On reviewing these instances, which indeed must be received as exceptions to the general results of observation and experience respecting the Negro faculties, I may observe, with Blumenbach, from whom some of them are borrowed, that entire and large provinces of Europe might be named, in which it would be difficult to meet with such good writers, poets, philosophers, and correspondents of the French Academy. These insulated facts are not, however, adduced to prove that the African enjoys an equality of moral and intellectual attributes with the European race; but merely to show, that, of the dark-colored people, none have distinguished themselves by stronger proofs of capacity for literary and scientific cultivation, and consequently that none approach more nearly than the Negro to the polished nations of the globe. That the Ethiopean, taken altogether, is decidedly inferior to the Caucasian variety in the qualities of the heart and of the head, will be soon recognized by any one who attentively weighs the representations of all unprejudiced and disinterested observers respecting the conduct, capabilities, and character of the Africans, whether in their own country, in the West Indies, or in America; and the continuance of the whole race, for more than twenty centuries in a condition which, in its best form, is little elevated above absolute barbarism, must give to this conviction the clear light and full force of demonstration. I cannot therefore admit, without some restriction and explanation, the quaint but humane expression of the preacher who called the Negro "God's image, like ourselves, though carved in ebony."

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* "Beyträge zur Naturgeschichte;" th. 1. p. 98.

† A characteristic portrait of this Ethiopian variety is represented in Blumenbach's work. Ibid.

As the external influences of climate, soil, situation, way of life, degree of civilization, habits, customs, form of government, religion, education, are manifestly inadequate to account for the very marked differences which at all times, in all countries, and under all circumstances, have characterized the white and the dark races, and the various subdivisions of each, we must look deeper for their causes, and seek them in some circumstances inseparably interwoven in the original constitution of man. In conformity with the views already explained respecting the mental part of our being, I refer the varieties of moral feeling, and of capacity for knowledge and reflection, to those diversities of cerebral organization which are indicated by, and correspond to, the differences in the shape of the skull. If the nobler attributes of man reside in the cerebral hemispheres; if the prerogatives which lift him so much above the brute are satisfactorily accounted for by the superior developement of those important parts; the various degrees and kinds of moral feeling and of intellectual power may be consistently explained by the numerous and obvious differences of size in the various cerebral parts, besides which there may be peculiarities of internal organization, not appreciable by our means of inquiry. Proceeding on these data, we shall find, in the comparison of the crania of the white and dark races, a sufficient explanation of the superiority constantly evinced by the former, and of the inferior subordinate lot to which the latter have been irrevocably doomed.

If examples can be adduced, either of nations having such a form of the brain and head as that which characterizes the Caucasian variety of man, placed under favorable circumstances for the developement of their moral and intellectual powers, and yet not advancing beyond the point which has been reached by the Africans or American tribes of the present time; or of the people, organized like the dark varieties, and reaching, under any circumstances, that degree of moral and intellectual cultivation which exists in the several polished countries of Europe; the preceding reasoning will be overturned: if no such instances can be brought forwards, the conclusion, that the marked differences between the white and dark-colored divisions of our species arise from original distinctions of organization, and not from adventitious circumcumstances, remains unshaken.

I cannot but respect the feelings of philanthropy, and the motives of benevolence, which have prompted many of our countrymen to exert themselves in behalf of the unenlightened and oppressed: I cannot contemplate without strong admiration, the heroic self-denial, and the generous devotion of those, who, foregoing the comforts, luxuries, and rational enjoyments of polished society, expose themselves to noxious climates and to all the perils of unknown countries, in order to win over the savage to the settled habits, the useful arts, and the various advantages of civilized life, to rescue him from the terrors of superstition, and bestow on him the inestimable blessings of mental culture and pure religion. But our expectations and exertions in this, as in other cases, must be limited by the natural capabilities of the subject. The retreating forehead and the depressed vertex of the dark varieties of man make me strongly doubt whether they are susceptible of these high destinies;—whether they are capable of fathoming the depths of science; of understanding and appreciating the doctrines and the mysteries of our religion. These obstacles will, I fear, be too powerful for Missionaries and Bible Societies; for Bell and Lancaster Schools. Variety of powers in the various races corresponds to the differences, both in kind and degree, which characterize the individuals of each race,—indeed, to the general character of all nature, in which uniformity is most carefully avoided. To expect that the Americans or Africans can be raised by any culture to an equal height in moral sentiments and intellectual energy with Europeans, appears to me quite as unreasonable as it would be to hope that the bull-dog may equal the greyhound in speed; that the latter may be taught to hunt by scent like the hound: or that the mastiff may rival in talents and acquirements the sagacious and docile poodle.

CHAPTER IX.

On the causes of the Varieties of the Human Species.

Having examined the principal points in which the several tribes of the human species differ from each other; namely, the color and texture of the skin, hair, and iris, the features, the skull and brain, the form and proportions of the body, the stature, the animal economy, the moral and intellectual powers, I proceed to inquire whether the diversities enumerated under these heads are to be considered as characteristic distinctions coeval with the origin of the species, or as the result of subsequent variation; and in the event of the latter supposition being adopted, whether they are the effect of external physical and moral causes, or of native or congenital variety. The very numerous gradations, which we meet with, in each of the points above mentioned, are an almost insuperable objection to the notion of *specific difference;* for all of them may be equally referred to original distinction of species; yet, if we admit this, the number of species would be overwhelming. On the other hand, the analogies drawn from the animal kingdom, and adduced under each head, nearly demonstrate that the characteristics of the various human tribes must be referred, like the corresponding diversities in other animals, to *variation.* Again, I have incidentally brought forwards several arguments to prove that external agencies, whether physical or moral, will not account for the bodily and mental differences which characterize the several tribes of mankind; and that they must be accounted for by the breed or race.* This subject, however, requires further illustration.

The causes which operate on the bodies of living animals, either modify the individual, or alter the offspring. The former are of great importance in the history of animals, and produce considerable alterations in individuals; but the latter are the most powerful, as they effect the species, and cause the diversities of the race. Great influences has at all times been ascribed to climate; which indeed has been commonly, but very loosely and indefinitely, represented as the cause of most important modifications in the human subject and in other animals. Differences of color, stature, hair, features, and those of moral and intellectual character, have been alike referred to the action of this mysterious cause; without any attempt to show which of the circumstances in the numerous assemblage comprehended under the word 'climate' produces the effect in question, or any indication of the mode in which the point is accomplished. That the constitution of the atmosphere varies in respect to light and heat, moisture and electricity; and that these variations, with those of elevation, soil, winds, vegetable productions, will operate decidedly on individuals, I do not mean to deny. While, however, we have precise information on the kind or degree of influence attributable to such causes, we have abundance of proof that they are entirely inadequate to account for the differences between the various races of men. I shall state one or two changes which seem fairly referable to climate.

The whitening (blanching or etiolation) of vegetables, when the sun's rays are excluded, demonstrates the influence of those rays on vegetable colors. Nor is the effect merely superficial; it extends to the texture of the plant, to the taste and other properties of its juices. Men much exposed to the sun and air, as peasants and sailors, acquire deeper tints of color than those who are more covered; and the tanning of the skin by the summer sun, in parts of the body exposed to it, as the face and hands, is a phenomenon completely analogous. The ruddy and tawny hues of those who live in the country, particularly of laborers in the open air, and the pale and sallow countenances of the inhabitants of towns, of close and dark workshops and manufactories, owe their origin to the enjoyment or privation of sun and air. Hence, men of the same race are lighter or darker colored according to the climate which they inhabit, at least in those parts which are uncovered, The native hue of the Moors is not darker than that of the Spaniards, of many French, and some English; but their acquired tint is so much deeper, that we distinguish them instantly. How swarthy do the Europeans become who seek their fortunes under the tropic and equator, and have their skins parched by the burning suns of "Afric and of either Ind!"

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* See sect. ii. chap. ii. p. 258 and following; chap. iv. p. 329 and following; chap. vi. p. 363.

Mr. Edwards represents that the Creoles in the English West-Indian Islands are taller than Europeans; several being six feet four inches high; and that their orbits are deeper.*

It has been generally observed by travellers, that the European population of the United States of North America is tall and characterized by a pale and sallow countenance. The latter effect is commonly produced in natives of Europe when they become resident in warm climates. That both sexes arrive earlier at puberty, and that the mental powers of children are sooner developed in warm than in cold countries, are facts familiarly known.

The prevalence of light colors in the animals of polar and cold regions may, perhaps, be ascribed to the influence of climate: the isatis or arctic fox, the polar bear, and the snow-bunting, are striking instances. The same character is also remarkable in some species, which are more dark-colored in warmer situations. This opinion is strengthened by the analogy of those animals which change their color in the same country, at the winter season, to white or grey, as the ermine (mustela erminea,) and weasel (m. nivalis,) the varying hare, squirrel, reindeer, white game (tetrao lagopus,) and snow-bunting (emberiza nivalis.)* **Pallas** observes, "that even in domestic animals, as horses and cows, the winter coat is of a lighter color than the smoother covering which succeeds it in the spring. This difference is much more considerable in wild animals. I have shown instances of it in two kinds of antelope (saiga and gutturosa,) in the musk animal (moschus moschifer,) and in the equus hemionus. The Siberian *roe*, which is red in summer, becomes of a grayish white in winter; wolves and the deer kind, particularly the elk and the rein deer, become light in the winter; the sable (m. zibellina) and the martin (m. martes,) are browner in the summer than in winter."†

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* *History of the West Indies*, v. 2. p. 11.

Although these phenomena seem obviously connected with the state of atmospherical temperature,—and hence the change of color, which the squirrel and the mustella nivalis undergo in Siberia and Russia, does not take place in Germany,‡—we do not understand the exact nature of the process by which it is effected; and cold certainly appears not to be the direct cause. For the varying hare, though kept in warm rooms during the winter, gets its white winter covering only a little later than usual ;|| and in all the animals, in which this kind of change takes place, the winter coat, which is more copious, close, and downy, as well as lighter colored, is found already far advanced in the autumn, before the cold sets in.§

The covering of animals, as well as their color, seems to be modified in many cases by climate; but as the body is naked in the human subject, and as the hair of the head cannot be regarded in the same light as the fur, wool, or hair which covers the bodies of animals generally, the analogies offered by the latter are not very directly applicable to the present subject.

In cold regions, the fur and feathers are thicker and more copious, so as to form a much more effectual defence against the cli-

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* Linnæus. *Flora Lapponica.*

† *Novæ Species Quadrupedum*, p. 7.

‡ Ibid. p. 6. note *k*. The ermine changes its color in the winter in Germany; but Pallas states, on the faith of sufficient testimony, that it does not undergo this change in the more southern districts of Asia and Persia.

|| *Novæ Species Quadrupedum*, p. 7.

§ Ibid. p 9.

mate than the coaser and rarer textures which are seen in warm countries. The thick fleece of the dogs lately brought from Baffin's Bay exemplifies this observation very completely. The wool of the sheep degenerates into a coarse hair in Africa: where we meet also with dogs quite naked, with a smooth and soft skin.

Whether the goat furnishing the wool from which the shawls of Cashmere are manufactured is of the same species with that domesticated in Europe, and whether the prodigious difference between the hairy growth of the two animals is due to diversity of climate, are points at present uncertain: neither do we know whether the long and silky coat of the goat, cat, sheep, and rabbits of Angora can be accounted for by the operation of this cause: it is at least worthy of notice, that this quality of the hair should exist in so many animals of the same country. It continues when they are removed into other situations, and is transmitted to the offspring; so that we may, probably, regard these as permanent breeds.

It is well known that the qualities of the horse are inferior in France to those of neighboring countries. According to BUFFON, Spanish or Barbary horses, when the breed is not crossed, become French horses sometimes in the second generation, and always in the third.* Since the climate of England, which certainly does not approach more nearly to that of the original abode of this animal than that of France, does not impede the developement of its finest forms and most excellent qualities, we may, perhaps, with greater probability, refer the degeneracy of the French horses to neglect of the breed. We know that the greatest attention to this point is necessary, in order to prevent deterioration in form and spirit.

Differences in food might be naturally expected to produce considerable corresponding modifications in the animal body. Singing-birds, chiefly of the lark and finch kinds, are known to become gradually black, if they are fed on hemp-seed only.† Horses fed on the fat marshy grounds of Friesland grow to a large size; while on stony soils or dry heaths, they remain dwarfish. Oxen become very large and fat in rich soils, but are distinguished by shortness of the legs; while, in drier situations, their whole bulk is less, and the limbs are stronger and more fleshy. The quantity of food has great influence on the bulk and state of health of the human subject; but the quality seems to have less power; and neither produces any of those differences which characterize races.

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* V. 4. p. 106.

† *Der Naturforscher*, pt. 1. p. 1. pt. 9. p. 22.

In all the changes which are produced in the bodies of animals by the action of external causes, the effect terminates in the individual; the offspring is not in the slightest degree modified by them,[*] but is born with the original properties and constitution of the parents, and a susceptibility only of the same changes when exposed to the same causes.

The change in the color of the human skin, from exposure to sun and air, is obviously temporary; for it is diminished, and even removed, when the causes no longer act. The discoloration, which we term tanning or being sun-burnt, as well as the spots called freckles, are most incidental to fair skins, and disappear when the parts are covered or no longer exposed to the sun. The children of the husbandman, or of the sailor whose countenance bears the marks of other climes, are just as fair as those of the most delicate and pale inhabitant of a city: nay, the Moors, who have lived for ages under a burning sun, still have white children; and the offspring of Europeans in the Indies have the original tint of their progenitors.

BLUMENBACH has been led into a mistake on this point by an English author,[†] who asserts that Creoles are born with a different complexion and cast of countenance from the children of the same parents brought forth in Europe. In opposition to this statement from one who had not seen the facts, I place the authority of LONG, a most respectable eye-witness, who in his *History of Jamaica*, affirms that "the children born in England have not, in general, lovelier or more transparent skins than the offspring of white parents in Jamaica." The "austrum spirans vultus et color," which the above-mentioned acute and learned naturalist ascribes to the Creole, is merely the acquired effect of the climate, and not a character existing at birth.

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[*] When the fœtus in utero has small-pox or syphilis, there is actual communication of disease by the fluids of the mother This is a case altogether different from those under consideration Neither does hereditary predisposition to particular diseases prove that acquired conditions are transmitted to the offspring. There are natural varieties of organization, disposing different individuals to different diseases on application of the same external causes These natural varieties, like those of form, color, and other obvious properties, are continued to the children

[†] HAWKESWORTH, in *Collection of Voyages*, v. 3. p. 374

"Nothing," says Dr. PRICHARD,[*] "seems to hold true more generally, than that all acquired conditions of body, whether produced by art or accident, end with the life of the individual in whom they are produced. Many nations mould their bodies into unnatural forms: the Indians flatten their foreheads; the Chinese women reduce their feet to one-third of their natural dimensions; savages elongate their ears; many races cut away the prepuce. We frequently mutilate our domestic animals by removing the tail or ears; and our own species are often obliged by disease to submit to the loss of limbs. That no deformity, or mutilation of this kind, is hereditary, is so plainly proved by every thing around us, that we must feel some surprise at the contrary opinion having gained any advocates. After the operation of circumcision has prevailed for three or four thousand years, the Jews are still born with prepuces, and still obliged to submit to a painful rite. Docked horses and cropped dogs bring forth young with entire ears and tails. But for this salutary law, what a frightful spectacle would every race of animals exhibit! The mischances of all preceding times would overwhelm us with their united weight; and the catalogue would be continually increasing, until the universe, instead of displaying a spectacle of beauty and pleasure, would be filled with maimed, imperfect, and monstrous shapes."

It is obvious that the external influences just considered, even though we should allow them a much greater influence on individuals than experience warrants us in admitting, would be still entirely inadequate to account for those signal diversities, which constitute differences of race in animals. These can be explained only by two principles already mentioned;* namely, the occasional production of an offspring with different characters from those of the parents, as a native or congenital variety; and the propagation of such varieties by generation. It is impossible, in the present state of physiological knowledge, to show how this is effected; to explain why a gray rabbit or cat sometimes brings forth at one birth, and from one father, yellow, black, white, and spotted young; why a white sheep sometimes has a black lamb; or why the same parents at different times have leucæthiopic children, and others with the ordinary formation and characters.

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[*] *Disp. Inaug.*

The state of domestication, or the artificial mode of life, which they lead under the influence of man, is the most powerful cause of varieties in the animal kingdom. Wild animals, using always the same kind of food, being exposed to the action of the climate without artificial protection, choose, each of them, according to its nature, their zone and country. Instead of migrating and extending, like man, they continue in those places which are the most friendly to their constitutions. Hence, their nature undergoes no change; their figure, color, size, proportions, and properties, are unaltered; and, consequently, there is no difficulty in determining their species. Nothing can form a stronger contrast to this uniformity of specific character than the numerous and marked varieties in those kinds which have been reduced by man. To trace back our domestic animals to their wild originals is in all cases difficult, in some impossible; long slavery has so degraded their nature, that the primitive animal may be said to be lost, and a degenerated being, running into endless varieties, is substituted in its place. The wild original of the sheep is even yet uncertain. BUFFON conceived that he discovered it in the mouflon or argali (ovis ammon): and PALLAS, who had an opportunity of studying the latter animal, adds the weight of his highly respectable authority to the opinion of the French naturalist. Yet BLUMENBACH regards the argali as a distinct species. Should we allow the latter to be the parent of our sheep, and consequently admit that the differences are explicable by degeneration, no difficulty can any longer exist about the unity of the human species. An incomplete horn of the argali, in the Academical Museum at Göttengen, weighs nine pounds.*

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* See p. 260 and following.

"Let us compare," says Buffon, "our pitiful sheep with the mouflon, from which they derived their origin. The mouflon is a large animal. He is fleet as a stag, armed with horns and thick hoofs, covered with coarse hair, and dreads neither the inclemency of the sky nor the voracity of the wolf. He not only escapes from his enemies by the swiftness of his course, and scaling, with truly wonderful leaps, the most frightful precipices; but he resists them by the strength of his body and the solidity of the arms with which his head and feet are fortified. How different from our sheep, which subsist with difficulty in flocks, who are unable to defend themselves by their numbers, who cannot endure the cold of our winters without shelter, and who would all perish if man withdrew his protection! So completely are the frame and capabilities of this animal degraded by his association with us, that it is no longer able to subsist in a wild state, if turned loose, as the goat, pig, and cattle are. In the warm climates of Asia and Africa, the mouflon, who is the common parent of all the races of this species, appears to be less degenerated than in any other region, Though reduced to a domestic state, he has preserved his stature and his hair; but the size of his horns is diminished. Of all domestic sheep, those of Senegal and India are the largest, and their nature has suffered least degradation. The sheep of Barbary, Egypt, Arabia, Persia, Tatary, &c. have undergone greater changes. In relation to man, they are improved in some articles, and vitiated in others; but with regard to nature, improvement, and degeneration, are the same thing; for they both imply an alteration of original constitution. Their coarse hair is changed into fine wool. Their tail, loaded with a mass of fat, and sometimes reaching the weight of forty pounds, has acquired a magnitude so incommodious, that the animals trail it with pain. While swollen with superfluous matter, and adorned with a beautiful fleece, their strength, agility, magnitude, and arms are diminished. These long-tailed sheep are half the size only of the mouflon. They can neither fly from danger, nor resist the enemy. To preserve and multiply the species, they require the constant care and support of man. The degeneration of the original species is still greater in our climes. Of all the qualities of the mouflon, our ewes and rams have retained nothing but a small portion of vivacity, which yields to the crook of the shepherd. Timidity, weakness, resignation, and stupidity, are the only melancholy remains of their degraded nature."*

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* Blumenbach, *Handbuch der Naturgeschichte*, p. 111, note.

The pig-kind afford an instructive example, because their descent is more clearly made out than that of many other animals. The dog, indeed, degenerates before our eyes; but it will hardly ever, perhaps, be satisfactorily ascertained whether there is one or more species. The extent of degeneration can be observed in the domestic swine; because no naturalist has hitherto been sceptical enough to doubt whether they descended from the wild boar; and they were certainly first introduced by the Spaniards into the New World. The pigs conveyed in 1509 from Spain to the West-India island Cubagua, then celebrated for the pearl fishery, degenerated into a monstrous race with toes half a span long.† Those of Cuba became more than twice as large as their European progenitors.‡ How remarkably, again, have the domestic swine degenerated from the wild ones in the Old World—in the loss of the soft downy hair from between the the bristles, in the vast accumulation of fat under the skin, in the form of the cranium, in the figure and growth of the whole body! The varieties of the domestic animal, too, are very numerous: in Piedmont they are almost invariably black; in Bavaria, reddish-brown; in Normandy, white, &c. The breed in England, with straight back and large pendulous belly, is just the reverse of that in the north of France, with high convex spine and hanging head: and both are different from the German breed; to say nothing of the solidungular race found in herds in Hungary and Sweden, and already known by ARISTOTLE, and many other varieties.

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* Buffon by Wood; v. 4. p. 7.

† Herrera, *Hechos de los Castellanos en las Islas, &c.* v. 1. p. 239.

‡ Clavigero, *Storia antica del Messico* v. 4. p. 145.

The ass, in its natural wild state, is remarkably swift and lively, and still continues so in his native Eastern abode.

The original stock of our poultry cannot be determined, nor can the varieties into which they have run be enumerated. No wild bird in our climates resembles the domestic cock; the pheasant, grouse, and cock of the woods, are the only analogous kind; and it is uncertain whether these would intermix and have prolific progeny. They have constituted distinct and separate species from the earliest times; and they want the combs, spurs, and pendulous membranes of the gallinaceous tribes.*

There are twenty-nine varieties of canary bird known by name, all produced from the gray bird.†

Most of the mammalia, which have been tamed by man, betray their subjugated state by having the ears and tail pendulous; a condition of the former parts, which, I believe, belongs to no wild animal. In many, the very functions of the body, as the secretions, generation, &c. are greatly changed. See the examples mentioned in Chap. VI. p. 411.

The application of these facts to the question concerning the human species is very obvious. If new characters are produced in the domesticated animal, because they have been taken from their primitive condition, and exposed to the operation of many, to them, unnatural causes; if the pig is remarkable among these, for the number and degree of its varieties, because it has been the most exposed to causes of degeneration; we shall be at no loss to account for the diversities in man, who is, in the true, though not ordinary sense of the word, more of a domesticated animal than any other. We know the wild state of most of them but we are ignorant of the natural wild condition to which man was destined. Probably there is no such state; because nature, having limited him in no respect, having fitted him for every kind of life, every climate, and every variety of food, has given him the whole earth for his abode, and both the organized kingdoms for his nourishment. Yet, in the wide range through which the scale of human cultivation extends, we may observe a contrast between the two extremities, analogous to that which is seen in wild and tamed races of animals. The savage may be compared to the former, which range the earth uncontrolled by man; civilized people to the domesticated breeds of the same species, whose diversities of form and color are endless. Whether we consider the several nations, or the individuals of each, bodily differences are much more numerous in the highly-civilized Caucasian variety, than in either of the other divisions of mankind.

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* BUFFON, v. 12. p. 112.

† Ibid. v. 14. p. 61.

Such, then, are the causes by which the varieties of man may be accounted for. Although I have acknowledged my entire ignorance of the manner in which these operate, I have proved that they exist, and have shown, by copious analogies, that they are sufficient to explain the phenomena. The tendency, under certain circumstance, to alterations of the original color, form, and other properties of the body, and the law of transmission to the offspring, are the sources of varieties in man and animals, and thereby modify the species: climate, food, way of life, in a word all the physical and moral causes that surround us, act indeed powerfully on the individual, but do not change the offspring, except in the direct manner just alluded to. We should, therefore, openly violate the rules of philosophising, which direct us to assign the same causes for natural effects of the same kind, and not to admit more causes than are sufficient for explaining the phenomena, if we recurred, for the purpose of explaining the varieties of man, to the perfectly gratuitous assumption of originally different species, or called to our aid the operation of climate, and other external influences.

Yet, if it be allowed that all men are of the same species, it does not follow that they all descend from the same family. We have no data for determining this point: it could indeed only be settled by a knowledge of facts, which have long ago been involved in the impenetrable darkness of antiquity.

By the most intelligent and learned writers on the varieties of mankind, their production has been explained in a different manner from that which has been just attempted; they have solved the problem entirely by the operation of adventitious causes, such as climate, particularly the light and heat of the sun, food, and mode of life. These, it is said, acting on men originally alike, produce various bodily diversities, and affect the color of skin especially: such alterations, transmitted to the offspring, and gradually increased through a long course of ages, are supposed to account sufficiently for all the differences observed at present in the inhabitants of the different regions of the globe. If we were disposed to submit, in this question, to authority, the number and celebrity of the philosophers* who have contended for the influence of climate, and other physical and moral causes, would certainly compel our assent to their opinions. Our respect for their talents and labors will be sufficiently marked, if we enter into a closer examination of the arguments which they have adduced on this subject.

That solar heat causes blackness of the skin, is an ancient opinion; and must have appeared very probable, when the Negro natives of the torrid zone were the only black people known. "Æthiopas," says PLINY, "vicini siderii vapore torreri, adustisque similes gigni, barba et capillo vibrato, non est dubium."†

"The heat of the climate," says BUFFON, "is the chief cause of blackness among the human species. When this heat is excessive, as in Senegal and Guinea, the men are perfectly black; when it is a little less violent, the blackness is not so deep; when it becomes somewhat temperate, as in Barbary, Mongolia, Arabia, &c, mankind are only brown; and lastly, when it is altogether temperate, as in Europe and Asia, men are white. Some varieties, indeed, are produced by the mode of living. All the Ta-

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* Among them are BUFFON, BLUMENBACH, SMITH, (*Essay on the Causes of the Variety of Complexion and Figure in the Human Species*, Philadelphia,) ZIMMERMANN (*Geographische Geschichte de Menschen*, &c.;) and FORSTER (*Observations made during a Voyage round the World*;) chap. vi. sec. 3. The arguments of these writers are very ably combated by DR. PRICHARD, in his *Researches into the Physical History of Man.*

† *Hist. Nát.* lib. ii. 80.

tars (Mongols,) for example, are tawny; while the Europeans, who live under the same latitude, are white. This difference may safely be ascribed to the Tatars being always exposed to the air, to their having no cities or fixed habitations, to their sleeping constantly on the ground, and to their rough and savage manner of living. These circumstances are sufficient to render the Tatars more swarthy than the Europeans, who want nothing to make life easy and comfortable. Why are the Chinese fairer than the Tatars, though they resemble them in every feature? Because they are more polished; because they live in towns, and practise every art to guard themselves against the injuries of the weather, while the Tatars are perpetually exposed to the action of the sun and air.

"Climate may be regarded as the chief cause of the different colors of men: but food, though it has less influence than color, greatly affects the form of our bodies. Coarse, unwholesome, and ill-prepared food makes the human species degenerate. All those people, who live miserably, are ugly and ill made. Even in France, the country people are not so beautiful as those who live in towns: and I have often remarked, that in those villages, where the people are richer and better fed than in others, the men are likewise more handsome, and have better countenances. The air and the soil have great influence on the figures of men, beasts, and plants.

"Upon the whole, every circumstance concurs in proving that mankind are not composed of species essentially different from each other; that, on the contrary, there was originally but one species, which, after multiplying and spreading over the whole surface of the earth, has undergone various changes, by the influence of the climate, food, mode of living, epidemic diseases, and mixture of dissimilar individuals; that, at first, these changes were not conspicuous, and produced only individual varieties; that these varieties became afterwards more specific, because they were rendered more general, more strongly marked, and more permanent, by the continual action of the same causes; that they are transmitted from generation to generation, as deformities or diseases pass from parents to children; and that, lastly, as they were originally produced by a train of external and accidental causes, and have only been perpetuated by time and the constant operation of these causes, it is probable that they will gradually disappear, or, at least, that they will differ from what they are at present, if the causes which produced them should cease, or if their operation should be varied by other circumstances and combinations."*

"In tracing the globe," says SMITH, "from the pole to the equator, we observe a gradation in the complexion, nearly in proportion to the latitude of the country. Immediately below the arctic circle, a high and sanguine color prevails: from this you descend to the mixture of red and white: afterwards succeed the brown, the olive, the tawny, and, at length, the black, as you proceed to the line. The same distance from the sun, however, does not, in every region, indicate the same temperature of climate. Some secondary causes must be taken into consideration, as correcting and limiting its influence. The elevation of the land, its vicinity to the sea, the nature of the soil, the state of cultivation, the course of winds, and many other circumstances, enter into this view. Elevated and mountainous countries are cool, in proportion to their altitude above the level of the sea,"† &c. &c.

BLUMENBACH informs us how climate operates in modifying the color of the skin, but does not attempt to explain its effects on the stature, proportions, and other points. He states that the proximate cause of the dark color of the integuments is an abundance of carbon, secreted by the skin with hydrogen, precipitated, and fixed in the rete mucosum by the contact of the atmospheric oxygen.‡ He observes further, that this abundance of carbon is most distinctly noticeable in persons of an atrabilarious temperament; which fact, together with many others, proves the intimate connexion between the biliary and the cutaneous organs; that hot climates exert a very signal influence on the liver: and thus, that an unnatural state of the biliary secretion, produced by heat, and increased through many generations, causes the vessels of the skin to secrete that abundance of carbon, which produces the black color of the Negro.[*]

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* *Natural History*, by WOOD, p. 443—449.

† *Essay*, p. 8—10.

‡ *De Gen. Hum. Var. Nat.* p. 124.

If any one can believe that the Negroes, and other dark people, whom we see in full health and vigor, and with every organic perfection, labor under a kind of habitual jaundice, he may think it worth while to inquire further into this assumed secretion and precipitation of carbon. It will then be necessary to explain how this jaundice is produced in the numerous dark races which dwell in temperate climates; and why it does not occur in the white people who occupy hot countries.

It cannot be supposed that men of undoubted talents and learning would take up these opinions without any foundation at all; and accordingly we find that there is a slender mixture of truth in these statements; but it is so enveloped in a thick cloud of error, and so concealed by misrepresentation and exaggeration, that we do not recognise it without difficulty. The color of Europeans nearly follows the geographical positions of countries: this part of the world is occupied almost entirely by a white race, of which the individuals are fairer in cold latitudes, and more swarthy or sunburnt in warm ones: thus, the French may be darker than the English, the Spaniards than the French, and the Moors than the Spaniards. In the same way, where different parts of a country differ much in latitude and in temperature, the inhabitants may be browner in the south than in the north: thus, the women of Granada are said to be more swarthy than those of Biscay, and the southern than the northern Chinese, &c. For a similar reason, the same race may vary slightly in color in different countries. The Jews, for example, are fair in Britain and Germany, browner in France and Turkey, swarthy in Portugal and Spain, olive in Syria and Chaldea. An English sailor, who had been for some years in Nukahiwah, one of the Marquesas islands, had been so changed in color, that he was scarcely to be distinguished from the natives.[†]

These diversities are produced by the climate, as I have already explained. The effect goes off if the cause be removed; it terminates in the individual, and is never transmitted to the offspring as I shall prove most incontrovertibly presently.

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[*] *De Gen. Hum. Var. Nat.* p 126—137.

[†] LANGSDORFF's *Voyages, &c.* v. 1. p. 90.

Moreover, the effect is confined to the parts of the body actually exposed to the sun and air. Those which remain covered, retain all their natural whiteness. Mr. ABEL found this strikingly exemplified in his Chinese journey. "The dark copper color of those who were naked, contrasted so strongly with the paleness of those who were clothed, that it was difficult to conceive such different hues could be the consequence of greater or less exposure to the same degree of solar and atmospheric influence; but all conjecture on this subject was set at rest by repeated illustrations of their effects. Several individuals, who were naked only from their waist upwards, stripped themselves entirely, for the purpose of going into the water to obtain a nearer view of the embassy. When thus exposed, they appear at a distance to have on a pair of light colored pantaloons."*

On a superficial view, again, we observe that temperate Europe is occupied by a white race: and that the blacks, of whom we see and hear most, dwell chiefly under the burning suns and on the parched sands of Africa and Asia; the numerous whites who live in hot, and the greater number of dark-colored people who are found in cold countries, are not taken into the account in these imperfect and partial comparisons.

I proceed to show that climate does not cause the diversities of mankind; and in this consideration, my remarks are chiefly directed to the color of the skin, as that is the part in which its operation has been regarded, by all the defenders of its influence, as the most unequivocal: the reasoning, however, will apply in general to the other points of difference, as well as to this.

The uniform color of all parts of the body is a strong argument against those who ascribe the blackness of the Negro to the same cause as that which produces tanning in white people; namely, the sun's rays. The glans penis, the cavity of the axilla, the inside of the thigh, are just as black as any other parts; indeed, the organs of generation, which are always covered, are among the blackest parts of the body. Neither is the peculiar color of the Negro confined to the skin; a small circle of the conjunctiva, round the cornea, is blackish, and the rest of the membrane has a yellowish-brown tinge. The fat has a deep yellow color, like bees-wax, at least in many of them; which may be distinguished, by a very superficial inspection, from that of an European. The representation that the brain of the Negro is darker colored than that of the white races, is not correct.

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* *Narrative of a Journey*, &c. p. 78.

The developement of the black color in the individual does not accord with the notion of its being produced by external causes. "Negro children," says Dr. Winterbottom, "are nearly as fair as Europeans at birth, and do not acquire their color until several days have elapsed. The eyes of the new-born Negro children are also of a light color, and preserve somewhat of a bluish tinge for several days after birth."*

Camper had an opportunity of observing the change in a Negro child born at Amsterdam. It was at first reddish, nearly like European children: "on the third day, the organs of generation, the folds of the skin round the nails, and the areolæ of the breasts, were quite black: the blackness extended over the whole body on the fifth and sixth days; and the boy, who was born in a close chamber in the winter, and well wrapped up, according to the custom of the country, in swaddling-clothes, acquired the native color of his race over the whole body, excepting the palms and soles, which are always paler, and almost white, in working Negroes."†

On the other hand, a black state of the skin is sometimes partially produced in individuals of the white races. In the fairest women, towards the end of pregnancy, spots of a more or less deep black color have been often observed: they gradually disappear after parturition. "The dark color of the skin," says White, "in some particular parts of the body, is not confined to either the torrid or frigid zones: for in England, the nipple, the areola round the nipple, the pudenda, and the verge of the anus, are of a dark brown, and sometimes as black as in the Samoiede women. It is to be remarked, that the color of these parts grows darker in women at the full period of gestation. One morning, I examined the breasts of twenty women in the Lying-in hospital in Manchester, and found that nineteen of them had dark colored nipples; some of them might be said to be black; and the areola round the nipple, from one inch to two inches and a half in diameter, was of the same color."* Le Cat mentions a woman near Paris, in whom the abdomen became black at each pregnancy, and afterwards recovered its color; in another, the same change occurred in the leg.†

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* *Account of the Native Africans*, v. 1. st. 1. p. 189.

† *Kleinere Schriften*, b. 1. st. 1. p. 44.

Camper dissected at Groningen a young woman who died in child-bed: her abdomen, and the areolæ round the nipples, were of a deep black: the face, arms, and legs, were of a snowy whiteness.‡

The species of domestic fowls in the East Indies with black periosteum, affords a further proof that the operation of the sun's rays is not a necessary circumstance to the production of color in animal bodies.

If we take the trouble of examining the races in any particular division of the world, we shall quickly find that the opinion which ascribes their distinguishing characters to climate, must be given up; that the same race inhabits the most different regions, preserving in all an uniformity of character; that different races are found in the same countries; and that those, who have changed their native abodes for situations, in which, according to the hypothesis, they ought to have undergone a complete metamorphosis, still retain their original distinctions.

In the north of Europe, as also in the north of Asia and America, that is, in countries nearest to the pole, in which according to the opinion above stated, the whitest races ought to be found, we have very brown and black people: they are much darker colored than any Europeans. The Moors in Africa, and the Arabs of the desert, are born with a white skin, and continue fair, unless adventitious causes are applied. But the Laplanders and Greenlanders, the Eskimaux, Samoiedes, Ostiacs, Tschutski, &c. who hardly ever feel a moderate heat from the rays of the sun, are very dark. They appear to be all of the same race, who have extended and multiplied along the coasts of the North Sea, in deserts, and under climates which could not be inhabited by other nations. They have broad large faces and flat noses, the olive or swarthy color, and all the other characters of the Mongolian variety.

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* *On the Regular Gradation*, p. 114.

† *Traité de la Couleur de la Peau Humaine*,

‡ *Kleinere Schriften*, v. 1. st. 1. p. 47.

It is curious to observe how easily the assertors of the power of climate in changing the human body get over an instance so fatal to their opinions: they tell us roundly, that great cold has the same effect as great heat: "when the cold becomes extreme, it produces effects similar to those of violent heat. The Samoiedes, Laplanders, and natives of Greenland, are very tawny: we are even assured that some of the Greenlanders are as black as the Africans; thus the two extremes approach each other; great cold and great heat produce the same effect upon the skin, because each of these causes acts by a quality common to both; and this quality is the dryness of the air, which, perhaps, is equally great in extreme cold and extreme heat. Both cold and heat dry the skin, and give it that tawny hue which we find among the Laplanders, Cold contracts all the productions of nature. The Laplanders, accordingly, who are perpetually exposed to all the rigours of frost, are the smallest of the human species."*

If this reasoning should not convince us, there are other arguments in reserve. The state of society is said to have great effect on the formation and color of the body. The nakedness of the savage, the filthy grease and paint with which he smears his body, his smoky hut, scanty diet, want of cleanliness, and the undrained and uncleared country which he inhabits, not only according to SMITH, darken his skin, but render it impossible that it ever should be fair.[*] On the other hand, the conveniences of clothing and lodging: the plenty and healthful quality of food; a country drained, cultivated, and freed from noxious effluvia; improved ideas of beauty, the constant study of elegance, and the infinite arts for attaining it, even in personal figure and appearance, give cultivated an immense advantage over savage society, in its attempts to counteract the influence of climate and to beautify the human form.[†] What false notions must mankind have hitherto entertained on this subject! We can no longer believe travellers, who tell us that the finest forms and the greatest activity are to be seen in savage tribes, and that no ill-formed individuals can be met with amongst them: and as little can we trust the testimony of our own senses, concerning the frequency of deformity and disease in civilized society; since there are so many reasons why the former should be deformed, black, and ugly, and the latter well-proportioned, and handsome. Unluckily, however, this theory does not correspond with a few plain facts. Most of the modern European nations existed in a more or less complete state of barbarism within times of which we have the most authentic records: some of these were seen and described by philosophers; yet the permanence of their characters is so remarkable after a greater progressive civilization than has happened in any other instance, that those descriptions are applicable, with the greatest exactness, to the same races of the present day. Instead, therefore, of accounting for the dark color, peculiar features, and stature of the Greenlander, Laplander, and Samoiede, from their smoke, their dirt, their food, or the coldness of their climate, we can have no hesitation in ascribing them to the same cause that makes the Briton and the German of this day resemble the portraits of their ancestors, drawn by Cæsar and Tacitus, viz. their descent from a race marked by the same characters as distinguish themselves. These tribes owe their origin to the Mongols: and retain in the north those marks of their descent, which we find as strongly expressed in the Chinese, under the widely-different latitudes of the south. At the same time, the parent tribes live in the middle of Asia, equally removed from the former and the latter.

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* Buffon. v. 3. p, 443. See also Smith's *Essay*.

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[*] *Essay*, &c. p, 48—52.

[†] Ibid. p. 53.

"With slight exceptions," says Dr. Prichard, "the different countries of Europe are now occupied by the same nations that have occupied them since the date of our earliest authentic accounts. Conquests have been made by small numbers, so that the races have been little changed by this cause. Thus when Clovis and his 30,000 Franks reduced the large and populous province of Gaul under their dominion, the bodily characters and the language of the conquerors were lost in those of the conquered. The nations which have inhabited Europe for the last 2500 years, consist of three great races, distinguished from each other by their bodily formation, character, and language.

"I. The Celtic race, with black hair and eyes, and a white skin verging to brown, occupies the west of Europe: to this belong the ancient and modern inhabitants of France, Spain, Portugal, and the greatest part of Italy; the ancient Britons, Welch, Bretons, Irish, Scotch, and Manks. The resemblance of the Silures to the Iberi was noticed by Tacitus; it is obvious to every observer in the present time; nor is the observation peculiar to the Welch; it holds good of all other Celtic nations. "Silurum colorati vultus, et torti plerumque crines, et posita contra Hispania, Iberos veteres trajecisse, easque sedes occupâsse, fidem faciunt." That black hair and a browner complexion belonged to all the Celts is not only proved by many direct observations, but also because the marks of the sanguine constitution were universally considered as the distinction of the German race.

"The great German race, characterized by its blue eyes, yellow or reddish hair, fair and red skin, occupies the middle of Europe, and includes the Swedes, Norwegians, Icelanders, Danes, ancient and modern Germans, Saxons and English, Caledonians or Pictæ, and the Lowland Scotch, who have sprung from them; the inhabitants of the Low Countries, the Vandals and Goths, &c. Historical records, and the similarity of language and character, both of body and mind, prove that all these people belong to the same race.

"III. The east of Europe contains the Sarmatian and Slavonic tribes, characterized by dark hair and eyes, and a darker skin than the German, with perhaps larger limbs than the Celts. To this division belong the Russians, Poles, Croats, Slavons, Bohemians, Bulgarians, Cossacks, and others who speak the Slavonic language."* He proceeds to show from Diodorus Siculus, that the Sarmatians descended from the Medes, and were found on the banks of the Tanais, 700 years before the Christian era: by the authority of Herodotus, that they occupied the country between the Tanais and the Borysthenes, when Darius Hystaspes invaded Syria; and from Cluverius, that the coasts of the Baltic, and the banks of the Vistula, Prussia, and the country as far as the situation of the Finni and Venedi, were the ancient seats of the Sarmatians. Since then a people of very different race have existed in the neighborhood of the Germans from the most remote times, how can we explain the differences of the European nations, by the operations of climate, by heat and cold? How does the same sky cause the whiteness of the German and Swede, and the comparatively dark complexion of the Pole and Russian?

But these European races are found also in Asia and Africa. All that part of the former region, which lies to the west of the river Ob, the Caspian Sea, and the Ganges; all the North of Africa, Abyssinia, and perhaps other parts still farther south, on the east, are occupied by a race agreeing nearly in character with the Sarmatians and Celts.

Thus it appears, that, excepting the Germans, and the Laplanders and Samoiedes, whom we deem of Mongolian origin, the same native or congenital constitution prevails over the whole of Europe, the western part of Asia, and the north of Africa. Black hair, dark eyes, and a white skin, tending rather to a brownish tint than to the peculiar whiteness of the German tribes, belong to the French, Spaniards, Portuguese, Italians, and all the Celts; to the Russians, Poles, and others of Slavonic origin; to the Tatars, commonly confounded with the Mongols, the Armenians, Persians, Circassians, and Georgians, the Turks, Greeks,

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* *Diss. Inaug. de Variet.* p. 102—109.

Arabians, Abyssinians, Syrians, Jews, and the inhabitants of Tripoli, Tunis, Algiers, and Morocco. That climate cannot cause similarity of character in nations spread over fifty degrees of latitude, and that food, dress, state of civilization, peculiar customs, or other moral causes, are equally inefficacious in accounting for the phenomenon when we consider how various in all these points the nations are in whom it occurs, will be allowed by every unprejudiced observer.

The middle and northern parts of Asia, and most of its eastern portion, are occupied by tribes and nations, all of which possess the general characters of the Mongolian variety, although distinguished from each other by such modifications as usually characterize separate people. They are distinct in their conformation from all other races, and differ from Europeans quite as decidedly as the Negroes. History points out as their original seat, the elevated central table land of Asia, from which they have spread in various directions, according to circumstances, every where preserving their peculiar traits of organization. The Mongols, Calmucks, and Burats, are three great divisions, of which each includes many tribes, scattered over the middle of Asia, leading generally a pastoral life, sometimes practising agriculture, and devoted universally to the idolatrous lama-worship. Their first distinct appearance in history is under the name of Huns (Hiong-nu of the Chinese,) in the first century of the Christian era, when they were impelled towards the west by the progress of the Chinese power. Afterwards three great conquerors appeared among them at distant periods,—the most conspicuous that the world has ever seen, who made all Asia and Europe tremble, but, happily, appeared and vanished like meteors; because though powerful in conquest and desolation, they knew not how to possess and govern. ATTILA with his Huns, penetrated into the centre of Europe. Eight centuries later, ZINGIS or DSCHINGIS KHAN united not only the Mongolian but the Tataric tribes, and with this formidable mass reduced nearly all Asia. In two hundred years more, TIMURLENG or TAMERLANE appeared, and rendered himself the terror of western Asia and India, which latter country has been ruled by his descendants until very modern times. The Mantchoos or Mandshurs, the Daourians, Tungooses, Coreans, Kamtschatkans, and perhaps other tribes, on the east; the Yakuts, Samoiedes, Kirgises, on the west; the people of Thibet and Bootan on the south; have a similar organization to that ofthe central tribes. The empires of China and Japan, the islands of Sagalien, Lewchew, and Formosa, are peopled by races of analogous physical and moral characters. Short stature, olive-colored skin, deviating into lighter yellow; coarse, straight, and perfectly black hair; broad flat face; high and broad cheek-bones, flat nose, oblique eyes, entire deficiency or smallness of beard, are the common traits of the numerous people spread over this immense portion of the globe. Besides this general agreement of the tribes occupying countries so distant and different from each other, it is important to observe that the Samoiedes, Kamtschatkans, and others in the colder northern parts, are darker-colored than the Chinese, Tunquinese, and Cochin Chinese, in the warm southern regions.

"India," says Dr. PRICHARD, "is inhabited by a mixed race made up of the aborigines, and of others, whom the pursuits of war and conquest have at various times brought there. The religion of BRAMAH seems to have been introduced from the north; and at later periods vast numbers of the Mongols have entered and conquered the country. These mixtures have effaced the peculiar characters of the original inhabitants; which we must therefore, seek for in the islands protected by their situation from such visits. The islands of the Indian Sea, as well as those of the Pacific, contain two races of men, differing in many respects. One of these approaches, and in some instances equals, the blackness of the Negro; the hair is curled and woolly, the body slender, the stature short, the disposition barbarous and cruel. The other is more like the Indians of the continent, has a fair skin, larger limbs and stature, better proportions, and exhibits some marks of humanity and civilization. According to FORSTER, the former, who are aborigines, have occupied the middle and mountainous parts of many islands, leaving the coasts and plains to the more recent colonists. They occupy the highest parts of the Moluccas, the Phillippines, Formosa, and Borneo; all New Guinea, New Britain, New Ireland, and New Caledonia, Tanna, Mallicollo, New Holland, and Van Dieman's Land. The more portion which occupies Sumatra and the other islands of the Indian Sea; Otaheite and the Society Islands, the Friendly Islands, Marquesas, Ladrones, Marian and Caroline Islands, New Zealand, Sandwich and Easter Islands. The language of all these countries is the Malay; and there can be no doubt that they arise from that race, and have spread by their ships over these distant spots. The black people are every where barbarous; and, according to FORSTER, have languages not agreeing with each other. In neither can we perceive any traces of the influence of the climate. The latter race, scattered in various parts of the vast island of New Holland, which has such variety of temperature, every where retains its black color, although the climate at the English settlement is not much unlike that of England: and in Van Diemen's Land, extending to 43° S. lat. (it is well understood that the cold is much more severe in the southern hemisphere, at an equal distance from the equator, than in the northern,) they are of a deep black, and have curled hair like the Negroes."*

The same observations are applicable to the Malay race. The inhabitants of Otaheite are very fair; yellow hair is not unfrequently seen amongst them: those of New Zealand, and of Easter Island, twice as distant from the equator, are much darker. "The fairness of the Sumatrans," says Mr. MARSDEN,† "situated as they are under a perpendicular sun, where no season of the year affords an alternation of cold, is, I think, an irrefragable proof that the difference of color in the different inhabitants of the earth is not the immediate effect of climate. The children of Europeans born in this island are as fair as those born in the country of their parents. I have observed the same of the second generation, when a mixture with the people of the country has been avoided. On the other hand, the offspring and all the descendants of the Guinea and other African slaves imported there continue in the last instance as perfectly black as in the original stock."

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* "Disp. Inaug. de Variet." p. 85—89.

† "History of Sumatra," ed. 3. p. 46.

The foregoing statements authorize us in concluding, that in Asia, where we have countries with every variety of situation and temperature, at every distance from the equator, mountains, valleys, plains, islands, and continents, no effect of climate can be traced on the color, or on any other characters of the human race.

On the hypothesis, which assigns the varieties of mankind to the operation of climate as their cause, we should expect to find in Africa all tribes under the equator of the most intensely black color; the tinge should become lighter and lighter as we proceed thence towards the south, and the complexion ought to be white when we arrive at regions which enjoy an European climate. This, however, is by no means the case. The Abyssinians, on the east, with dark-olive color and long hair, are placed near the equator, and surrounded by Negroes. In the same part also, the Gallas, a great and barbarous nation, having according to Bruce, long black hair, and white skin verging to brown, occupy extensive regions under the equator itself. On the other hand, as we proceed from the equator towards the south, through tribes of Negroes, we find the black color continued with undiminished intensity. It is known in the West Indies, that the Congo Negroes, in the blackness of their skin and woolly hair, equal any race of Africans. Paterson assures us that the Kaffers, within a few degrees of the Cape of Good Hope, where the climate is so far from being intolerably hot, that the corn is often hurt by the winter frost, are of the deepest color; and the same fact is familiarly known of surrounding tribes.

The island of Madagascar, which is cooled by the mild breezes of the Indian Ocean, and ought, therefore, to contain a white race has two kinds of natives: one of olive color with dark hair; the other, true Negroes.

The Hottentots, at one or two degrees from the deep-black Kaffers, are of a brownish yellow color: this distance can hardly account for the difference.

When we consider how large an extent of Africa is occupied by the black woolly-haired Negroes; and that these regions vary in their latitude, their elevation, and every other point; that they include sandy deserts, coasts, rivers, hills, valleys, and very great varieties of climate; the conclusion that other circumstances do not influence the color or other properties of the race is irresistible.

It only remains for us to examine the continent of America; which as it stretches uninterruptedly from the neighbourhood of the north pole to 55° S. lat. and includes regions diversified in every possible way, affords the most ample opportunity for the development of all the changes that climate and position can produce; and to examine whether the facts ascertained concerning its inhabitants are more favorable to the hypothesis under consideration, than what we have observed in the other three divisions of the world.

The reports of travellers are unanimous concerning the identity of general character in the whole American race: copper-colored skin, long and straight black hair, and a certain cast of features, are said to belong to all the inhabitants of this extensive continent. How remarkable this agreement is, may be collected from the statement sometimes made, that a person who has seen one may consider that he has seen all; which, however, in its full extent, must be regarded as an exaggerated or partial view. The Eskimaux are not included in this account; their color is more of the olive cast: in which, as well as in other points, they betray their Mongolian origin. They retain in America the same character which distinguish the Mongolian tribes and natives of the old continent.

The most intelligent and accurate observers have informed us that nearly all the native tribes, whether of the northern, middle, or southern parts of America, have the skin of a more or less red tint; and some of them expressly state that its lighter or darker shades are entirely uninfluenced by any of the causes connected with geographical position.

"The Indians (Americans,") says ULLOA, "are of a copper color, which by the action of the sun and and air, grows darker. I must remark, that neither heat nor cold produces any sensible change of color, so that the Indians of the Cordilleras of Peru are easily confounded with those of the hottest plains; and those who live under the line cannot be distinguished by the color from those who inhabit the fortieth degrees of north and south latitude."*

Hearne† and **Mackenzie**‡ found the hunting tribes in the cold regions about Hudson's Bay and thence to the Frozen Ocean, copper-colored and black haired. **Lewis** and **Clarke**|| describe those on the Columbia, and near its mouth, as of the "usual copper-colored brown of the North American tribes; though rather lighter than that of the Indians of the Missouri and the frontier of the United States." **Wafer**§ and **Dampier**¶ found the same tint in the Isthmus of Darien, **Bouguer**** and **Condamine**†† under the equator, **Stedman**‡‡ and others in Brazil, **Molina**|||| in Chili, **Wallis**§§ and **Cook**¶¶ in Patagonia and Tierra del Fuego. **Humboldt**, whose extensive opportunities of observation and philosophic spirit give great weight to his statements, confirms these representations in the most ample manner. "The Indians of New Spain bear a general resemblance to those who inhabit Canada, Florida, Peru, and Brazil; they have the same swarthy and copper-color, flat and smooth hair, small beard, squat body, long eye, with the corner directed upwards towards the temples, prominent cheek-bones, thick lips, and an expression of gentleness in the mouth, strongly contrasted with a gloomy and severe look. The

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* "Noticias Americanas:" cap. 17. p. 307; quoted in Humboldt, "Personal Narative," 3, 207.

† "Journey from Hudson's Bay to the Northern Ocean:" ch. 9. p. 305.

‡ "Travels through the Continent of North America;" pref. remarks, p. 92.

|| "Travels," 4to p. 437.

§ "New Voyage and Description," &c. p, 134.

¶ "Voyage round the World;" v. 1. p. 7.

** "Acad. des Sciences," 1744, p. 273.

†† Ibid. 1745, p. 418.

‡‡ "Travels in Surinam," v. 1. p. 395.

|||| "Natural History of Chili," p. 274. Of the Araucans; "Civil History," p. 54.

§§ "Hawkesworth's Collection of Voyages," v. 1. 374.

¶¶ Ibid. v. 2. p. 55.

American race, after the Hyperborean* race, is the least numerous; but it occupies the greatest space in the globe. Over a million and a half of square leagues, from the Tierra del Fuego islands to the river St. Lawrence and Bering's Straits, we are struck, at the first glance, with the general resemblance in the features of the inhabitants. We think we perceive that they all descend from the same stock, notwithstanding the enormous diversity of language that separates them from each other. However, when we reflect more seriously on this family likeness, after living longer among the indigenous Americans, we discover that celebrated travellers, who could only observe a few individuals on the coasts, have singularly exaggerated the analogy of form among the Americans.

"Intellectual cultivation is what contributes most to diversify the features. In barbarous nations there is rather a physiognomy peculiar to the tribe or horde than to any individual. When we compare our domestic animals with those which inhabit our forests, we make the same observation. But an European, when he decides on the great resemblance among the copper colored races, is subject to a particular illusion. He is struck with a complexion so different from our own; and the uniformity of this complexion conceals from him for a long time, the diversity of individual features. The new colonist can at first hardly distinguish from each other individuals of the native race, because his eyes are less fixed on the gentle melancholic or ferocious expression of the countenance, than on the red-coppery color, and dark, coarse, glossy, and luminous hair: so glossy, indeed, that we should believe it to be in a constant state of humectation.

"The Indians of New Spain have a more swarthy complexion than the inhabitants of the warmest climates of South America. This fact is so much the more remarkable, as in the race of Caucasus, which may also be called the European Arab race, the people of the south have not so fair a skin as those of the north. Though many of the Asiatic nations who inundated Europe in the sixth century had a very dark complexion, it appears that the shades of color observable among the white race are less owing to their origin or mixture than to the local influence of the climate. This influence appears to have almost no effect on the Americans and Negroes. These races, in which there is abundant deposition of carburetted hydrogen in the corpus mucosum or reticulatum of Malpighi, resist in a singular manner the impressions of the ambient air. The Negroes of the mountains of Upper Guinea are not less black than those who live upon the coast. There are, no doubt, tribes of a color by no means deep among the Indians of the new continent, whose complexion approaches to that of the Arabs or Moors. We found the people of the Rio Negro swarthier than those of the lower Orinoco, and yet the banks of the first of these rivers enjoy a much cooler climate than the more northern regions. In the forests of Guiana, especially near the sources of the Orinoco, are several tribes of a whitish complexion,—the Guaicas, Guaiaribs, the Ariguas; of whom several robust individuals, exhibiting no symptom of the asthenical malady which characterizes Albinos, have the appearance of true Mestizos. Yet these tribes have never mingled with Europeans, and are surrounded by other tribes of a dark-brown hue. The Indians in the torrid zone, who inhabit the most elevated plains of the Cordillera of the Andes, and those who, under 45° S. lat. live by fishing among the islands of the Archipelago of Chonos, have as coppery a complexion as those who under a burning climate cultivate bananas in the narrowest and deepest valleys of the equinoctial region. We must add, that the Indians of the mountains are clothed, and were so long before the conquest; while the aborigines, who wander over the plains, go quite naked, and are consequently always exposed to the perpendicular rays of the sun. I could never observe that, in the same individual, those parts of the body which were covered were less dark than those in contact with a warm and humid air. We every where perceive that the color of the American depends very little on the local position in which we see him.

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* The author probably means to include under this name the diminutive olive-colored black-haired people of the Mongolian formation who occupy the high northern latitudes of both continents: viz. the Eskimaux, Laplanders Samoiedes, and Tungooses.

"The Mexicans, as we have already observed, are more swarthy than the Indians of Quito and New Granada, who inhabit a climate completely analogous; and we even see that the tribes dispersed to the north of the Rio Gila are less brown than those in the neighborhood of the kingdom of Guatimala. This deep color continues to the coast nearest Asia. But under 54° 10′ of North latitude, at Cloak Bay, in the midst of copper-colored Indians, with small long eyes, there is a tribe with large eyes, European features, and a skin less dark than that of our peasantry."[*]

How does it happen, that the same sun, which makes the African black, tinges the American of a copper color? and that the dark hue, which might possibly be produced by heat, in the equatorial regions, should be found also in the cold and inhospitable tracts of Tierra del Fuego, and the most northern part of the continent? The absence of white races can surely not be ascribed to the want of sufficiently cold climates. BOUGAINVILLE found the thermometer, in the middle of summer, 54½° in lat. 52° S.; and Messrs. BANKS and SOLANDER, and their attendants, had nearly perished altogether from the cold, in an excursion in Tierra del Fuego, in the middle of the summer. Two of the servants were actually lost.[†]

A very cursory survey of the globe will show us, that the same regions have been occupied by men of different races, without any interchange of characters, in many instances, for several centuries. The Moors and Negroes are found together in Africa; Europeans, Negroes, and Americans, in North and South America; Celts, Germans, and Slavons, in Europe, and even in the same kingdoms of Europe; Mongols, Afghans, and Hindoos, in India, &c. &c. The distinction of these different races, except where they have been confused by intermarriage, is just as easy now as it has been in any time of which we have authentic records.

The permanency of the characters, of any race, when it has changed its original situation for a very different one, when it has passed into other climes, adopted new manners, and been exposed to the action of these causes for several generations, affords the most indisputable proof that these characteristics are not the offspring of such adventitious circumstances. From the numerous examples in every race, which a slight knowledge of history will furnish, I shall select a few of the most striking.

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[*] *Political Essay on the Kingdom of New Spain*, v. 1. p. 140—145.

[†] HAWKESWORTH'S *Collection*, v. 2. ch. 4.

In the earliest times to which our historical records ascend, the west of Europe was occupied by Celtic people, with brownish-white skin, dark hair and eyes: the characters, in short, which are now visible in the Spaniards, most of the French, the native Welsh, the Manks, and the Highland Scotch. The German race, originally situated more to the north and east, have long ago obtained settlements by war and conquest in many of the countries previously peopled by the Celts; but their light-rosy skin, flaxen hair, and blue eyes, are now, after nearly two thousand years, just as strongly contrasted with the very different traits of the Celtic character, in those situations and those families where the blood has remained pure, as they were originally.

It was observed by Cæsar, that the Germans had possessed themselves of the Belgic provinces of Gaul, and the contiguous southern parts of Britain.[*] That the Caledonians or Picts (Lowland Scotch) were a German people, is rightly represented by Tacitus, whose description of the natives occupying this island exhibits the same physical characters which exist in the present day. "Habitus corporum varii: atque ex eo argumenta; namque rutilæ Caledoniam habitantium comæ, magni artus Germanicam originem adseverant. Silurum colorati vultus, et torti plerumque crines, et posita contra Hispania, Iberos veteres trajecisse, easque sedes occupâsse fidem faciunt: proximi Gallis, et similes sunt: seu durante originis vi, seu procurrentibus in diversa terris, positio cœli corporibus habitum dedit."[†] Under the name of Saxons, Angles, Danes, and Normans, numerous supplies of Germans successively arrived in England, and gradually drove the original Celtic population into the most distant and inaccessible parts of the island. An exposure to the same climate for so many centuries has not approximated the physical characters of the more recent Germans to those of the older Celtic inhabitants in the smallest degree; and both descriptions are equally unchanged after a progress from barbarism to the highest civilization. A similar permanence of the original distinctive characters is observable in France. "Among us," says VOLNEY, "a lapse of nine hundred years has not effaced the discriminating marks which distinguished the inhabitants of Gaul from the northern invaders, who under CHARLES THE GROSS, settled themselves in our richest provinces. Travellers, who go from Normandy to Denmark, observe with astonishment the striking resemblance of the inhabitants of these two countries."*

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[*] *De Bell. Gall.* lib. 2. & 5.

[†] *Agricola*, 11.

The Vandals† passed from Spain into Africa about the middle of the fifth century: their descendants may be still traced, according to SHAW‡ and BRUCE,|| in the mountains of Aures, by their white and ruddy complexion and yellow hair. "Here I met," says the latter writer," to my great astonishment, a tribe, who, if I cannot say they were fair like the English, were of a shade lighter than that of the inhabitants of any country to the southward of Britain. Their hair also was red, and their eyes blue."—"I imagine them to be a remnant of the Vandals. PROCOPIUS mentions a defeat of an army of this nation here, &c. They confessed their ancestors had been Christians." The change in the race produced by climate must be infinitely small, since it is not yet perceptible, after a lapse of thirteen centuries.

The establishments of the Europeans in Asia and America have now subsisted about three centuries. VASQUEZ DE GAMA landed at Calicut in 1498; and the Portuguese empire in India was founded in the beginning of the following century. Brazil was discovered and taken possession of by the same nation in the very first year of the sixteenth century. Towards the end of the fifteenth, and the beginning of the sixteenth century, COLUMBUS, CORTEZ, and PIZARRO, subjugated for the Spaniards the West-Indian islands, with the empires of Mexico and Peru. Sir WALTER RALEIGH planted an English colony in Virginia in 1584; and the French settlement of Canada has rather a later date. The

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* *Travels in Syria and Egypt*, v. 1. ch. 6.

† GIBBON: *Decline and Fall*, ch. 33.

‡ *Travels*, ch. 3.

|| *Travels to discover*, &c. 8vo. ed. Introduction, p. 35.

colonists have, in no instance, approached to the natives of these countries: and their descendants, where the blood has been kept pure, have, at this time, the same characters as native Europeans. In the hotter situations, indeed, as in the warmer countries of Europe, the skin is swarthy in parts of the body which are not covered; but the children, at the time of birth, and women who are never exposed much to the sun's rays, have all their native whiteness. This observation admits of no exception: in the tint of the skin, the color and other qualities of the hair, the features, the form of the cranium, the proportions and figure of the body, the European colonists retain all their original characters. The sanguine constitution, with its blue eyes, yellow hair, and fair skin, which is so remarkably different from that of the natives, is nevertheless transmitted, without the least alteration, from generation to generation.

Negroes have been introduced into the New World for nearly an equal length of time: in the West-Indian islands, in the United States, in the various parts of Spanish America, they live under new climates, and have adopted new habits; yet they have still woolly hair, black skins, flat nose, thick lips, and all the other characters of their race.

The inhabitants of Persia, of Turkey, of Arabia, of Egypt, and of Barbary,* may be regarded in great part as the same race of people, who, in the time of Mahomet and his successors, extended their dominions by invading immense territories. In all these situations the skin retains its native fairness, unless the skin be changed by exposure to the sun; and the children are invariably fair. "Il n'y a femme de laboureur ou de paysan en Asie (Asia Minor) qui n'a le teint frais comme une rose, la peau delicate et blanche, si polie et si bien tendue, qu'il semble toucher du velours."* The Arabians are scorched by the heat of the sun; the most of them are either covered with a tattered shirt, or go entirely naked. La Boullaye informs us, that the Arabian women of the desert are born fair, but that their complexions are spoiled by being continually exposed to the sun.† Another traveller remarks, that the Arabian princesses and ladies, whom he was permitted to see, were extremely handsome, beautiful, and fair, because they are always covered from the rays of the sun; but that the common women are very much blackened by the sun.‡

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* Africa, north of the great desert, has been always inhabited by races of Caucasian formation. The original tribes, called Berbers or Brebers, have given the name of Barbary to this division of the continent. We know but little of their peculiar physical characters; which, however, probably were similar to those of the ancient Egyptians and Guanches. These Berbers, which constituted the people known to the Roman writers by the names of Lybians, Getulians, Numidians, Mauritanians, Garamantes, have received accessions of Phœnicians (the Carthaginians,) Greeks, Romans, Vandals, and Arabians. The latter particularly entered the north of Africa in great numbers, destroying or driving away the original inhabitants. The general prevalence of Mahomedanism and of the Arabian language, testifies the impression which they made on the country. The remnants of the aboriginal tribes are now principally found in the mountains. They may be traced, however, south of the great desert, and seem to form even considerable states between Tombuctoo and Upper Egypt; where they preserve their distinctive characters in the same climates with the Negro race.

The Moors, who have lived in Africa since the seventh century, have not degenerated in their physical constitution from their Arabian progenitors: the sun exerts its full influence on their skin, but their children are just as white as those born in Europe. They are by no means confined to the northern coast, but have penetrated, as the prevalence of the Mahomedan religion attests, deeply into the interior: here they dwell in countries, of which the woolly-haired Negro is the native, but have not acquired, in six centuries of exposure to the same causes, any of his characters. The intelligent and accurate Shaw informs us, that most of the Moorish women would be reckoned handsome even in Europe: that the skin of their children is exceedingly fair and delicate; and though the boys, by being exposed to the sun, soon grow swarthy, yet the girls, who keep more within doors, preserve their beauty till the age of thirty, when they commonly give over child-bearing. "Les Maures," says Poiret, "ne sont pas naturellement noirs, malgré le proverbe, et comme le pensent plu-

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* *Obs. de* Pierre Belon, p. 199.

† *Voyages de* La Boullaye le Gouz, p. 318.

‡ *Voyage fait par Ordre du Roi dans la Palestine*, p. 260.

sieurs écrivains; mais ils naissent blancs, et restent blancs toute leur vie, quand leurs travaux ne les exposent pas aux ardeurs du soleil. Dans les villes, les femmes ont une blancheur si éclatante, qu'elles eclipseroient la plupart de nos Européennes; mais les Mauresques montagnardes, sans cesse brulées par le soleil, et presque toujours à moitiè nues, deviennent, même dés l'enfance, d'une couleur brune qui approche beaucoup de celle de la suie."* The testimony of Bruce is to the same effect.

That the swarthiness of the southern Europeans is merely the effect of the sun's action on the individual, whose children are born perfectly white, and continue so unless exposed to the operation of the climate, might be easily proved of the Spaniards and Portuguese, the Greeks, Turks, &c; but the fact is too well known to render this necessary.

The Jews exhibit one of the most striking instances of national formation, unaltered by the most various changes. They have been scattered, for ages, over the face of the whole earth; but their peculiar religious opinions and practices have kept the race uncommonly pure; accordingly, their color and their characteristic features are still the same under every diversity of climate and situation.

The advocates for the power of climate have made very erroneous representations respecting these people; asserting that their color is everywhere modified by the situation they occupy. The Jews, like all the native people adjoining their original seats, have naturally a white skin and the other attributes of the Caucasian race. In hot countries they become brown by exposure, as an European does, but they experience no other influence from climate. Their children are born fair; and the countenance and other characters are every where preserved in remarkable purity, because their religion forbids all intermixture with other races. Dr. Buchanan met, on the coast of Malabar, with a tribe, who represented, that their ancestors had migrated from Palestine after the destruction of the temple by Titus, and who have preserved their native color and form amidst the black inhabitants of the country, excepting in instances where they have intermarried with the Hindoos. Those of pure blood are called White Jews, in contradistinction from the others, who are termed Black Jews.*

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* *Voy. en Barbarie*, tom. 1. p. 31.

The foregoing facts sufficiently prove, that native differences in general, and particularly that of color, do not depend on extraneous causes: I have an observation or two to make on some other points. That the curled state of the hair in the African is not produced by heat, appears, from its being found in many situations not remarkable for high temperature, as in the Moluccas, New Guinea, Mallicollo, Borneo, New Holland, and even in the cold regions of Van Diemen's Land; as well as from the hot regions of Asia and America being inhabited by long haired races.

The woolly appearance of the Negro hair is just opposite to that which hot climates have been said to produce in the covering of sheep, in which it is represented that hair is produced instead of wool. When we contrast the hairy coat of the argali or moufflon with the beautiful fleeces of our most valuable sheep, we see a prodigious difference, which is probably owing more to cultivation and attention to breed than to climate. It does not appear, at least, that change of climate will convert the wool of an individual English sheep into hair; and it is equally incapable of conferring a woolly covering on the hairy sheep. Dr. WRIGHT† who lived many years in Jamaica, speaking of the opinion that the wool of sheep becomes more hairy in warm climates, says, that in the West-India islands there is to be found a breed of sheep, the origin of which he has not been able to trace, that carry very thin fleeces of a coarse shaggy kind of wool; which circumstance, he thinks, may naturally have given rise to the report. But he never observed a sheep that had been brought from England to carry wool of the same sort with those native sheep: on the contrary, though he has known them live there several years, these English sheep carried the same kind of close burly fleece that is common in England; and, in as far as he could observe, it was equally free from hairs.

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* *Christian Researches in Asia*; section, On the Jews.

† Dr. ANDERSON *on the different Kinds of Sheep*; Appendix II.

The differences in stature, again, have been very confidently ascribed to adventitious causes. A temperate climate, pure air, copious food, tranquillity of mind, and healthy occupations, have been thought favorable to the full developement of the human frame; while extreme cold, bad and unwholesome food, noxious air, and similar causes, have been thought capable of reducing the dimensions of the body below the ordinary standard. That these causes may have some effect on individuals, I do not deny, although I believe that it is very slight: but the numerous examples of large people in cold countries, and diminutive men in warm climes, induce me to deny altogether its operation on the race. The tall and large-limbed Patagonians, certain North-American tribes, and some of the German races, inhabit cold situations: the Mongols, who are small in stature, live in warm countries.

The facts and observations adduced in this section lead us manifestly to the following conclusions: 1st. That the differences of physical organization, and of moral and intellectual qualities, which characterize the several races of our species, are analogous in kind and degree to those which distinguish the breeds of the domestic animals; and must, therefore, be accounted for on the same principles. 2dly. That they are first produced, in both instances, as native or congenital varieties; and then transmitted to the offspring in hereditary succession. 3dly. That, of the circumstances which favor this disposition to the production of varieties in the animal kingdom, the most powerful is the state of domestication. 4thly. That external or adventitious causes, such as climate, situation, food, way of life, have considerable effect in altering the constitution of man and animals: but that this effect, as well as that of art or accident, is confined to the individual, not being transmitted by generation, and therefore not affecting the race. 5thly. That the human species, therefore, like that of the cow, sheep, horse, and pig, and others, is single; and that all the differences, which it exhibits, are to be regarded merely as varieties.

If, in investigating the subject, we are satisfied with comparing the existing races of men to those of the domestic animals, and with bringing together the characteristic marks, on which the distinctions are grounded in the two cases, as I have done in several preceding chapters, we shall have no difficulty in arriving at the fifth conclusion. If, however, we should carry ourselves back, in imagination, to a supposed period, when mankind consisted of one race only,—and endeavor to show how the numerous varieties, which now occupy the different parts of the earth, have arisen out of the common stock, and have become so distinct from each other, as we find them at present,—we cannot arrive at so satisfactory a decision: and we experience further embarrassments from the fact, that the races have been as distinctly marked and as completely separated from the earliest periods, to which historical evidence ascends, as they now are. The same remarks, in great measure, are true, concerning animals; so that, on this ground, no difficulty prevents us from recognising the unity of the human species, which is not equally applicable to them.

CHAPTER X.

Division of the Human Species into Five Varieties.

After taking into consideration the principal circumstances which characterize the several races of man, and arriving—by the proof that all such distinctions are produced in a still greater degree among animals, chiefly of the domesticated kinds, from the ordinary sources of degeneration—at the conclusion, that there is only one species ; it remains for me to inquire how many varieties ought to be recognized in this species, and to enumerate the characters by which they may be distinguished. As there is no circumstance, whether of corporal structure or of mental endowment, which does not pass by imperceivable gradations into the opposite character, rendering all those distinctions merely relative, and reducing them to differences in degree, it is obvious that any arrangement of human varieties must be in great measure arbitrary. Our imperfect knowledge of several tribes constitutes another very serious difficulty. A complete and accurate arrangement cannot therefore be expected at present; and it is more advisable to adopt a general one, which may answer the purpose of classifying the facts already known, and affording points of comparison in aid of future inquiry, than to attempt the details and minuter distinctions, for which we must depend on further investigation.

I think it best to follow the distribution proposed by Blumenbach, although it is not free from objection; and although the five varieties, under which he has arranged the several tribes of our species, ought rather to be regarded as principal divisions; each of them including several varieties.

This acute and judicious naturalist divides the single species, which the genus *Homo* contains, into the Caucasian, Mongolian, Ethiopian, American, and Malay varieties. He regards the Caucasian as the primitive stock. It deviates into two extremes, most remote and different from each other: namely, the Mongolian on one side, and the Ethiopian on the other. The two other varieties hold the middle places between the Caucasian and the two extremes; that is, the American comes in between the Causasian and Mongolian; and the Malay between the Caucasian and Ethiopian.

The following marks and descriptions will serve to define these five varieties. But it is necessary to observe, in the first place, that on account of the multifarious diversity and gradation of characters, one or two are not sufficient for determining the race; consequently, that an enumeration of several is required: and, secondly, that even this combination of characters is subject to numerous exceptions in each variety. The migrations of the several races in quest of more eligible abodes, the changes of situation consequent on invasion, war, and conquest, and the intermarriages to which these lead, account for much of this uncertainty. Thus the Mongolian and Caucasian varieties have been much intermixed in Asia; the latter, and the Ethiopian, in Africa.

I Caucasian Variety.*—*Characters.* A white skin, either with a fair-rosy tint, or inclining to brown; red cheeks; hair black, or of the various lighter colors. copious, soft, and generally more or less curled or waving. Irides dark in those with brown skin, light (blue, gray, or greenish) in the fair or rosy-complexioned. Large cranium with small face; the upper and anterior regions of the former particularly developed; and the latter falling perpendicularly under them. Face oval and straight, with features distinct from each other; expanded forehead, narrow and rather aquiline nose, and small mouth; front teeth of both jaws perpendicular; lips, particularly the lower, gently turned out; chin full and rounded. Moral feelings and intellectual powers most energetic, and susceptible of the highest developement and culture.

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* The name of this variety is derived from Mount Caucasus; because in its neighborhood, and particularly towards the south, we meet with a very beautiful race of men, the Georgians; (see the quotation from Chardin, at p. 311;) and because, so far as the imperfect lights of history and tradition extend the original abode of the species seems to have been near the same quarter.

It includes all the ancient and modern Europeans, except the Laplanders and the rest of the Finnish race; the former and present Inhabitants of Western Asia, as far as the river Ob, the Caspian Sea, and the Ganges; that is, the Assyrians, Medes, and Chaldeans; the Sarmatians, Scythians, and Parthians; the Philistines, Phœnicians, Jews, and the inhabitants of Syria generally; the Tatars,[*] properly so called; the several tribes actually occupying the chain of Caucasus; the Georgians, Circassians, Mingrelians, Armenians; the Turks,[†] Persians,[‡] Arabians,[||] Afghauns,[§] and Hindoos[¶] of high caste; the northern Africans, including not only those north of the Great Desert, but even some tribes placed in more southern regions; the Egyptians,* Abyssinians,† and Guanches.

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[*] For an account of the people, to whom this name of Tatar has been applied at various periods of history, and of those to whom it is more strictly applicable, see ADELUNG's *Mithridates*, v. 1. p. 453, and following. Portraits of Tatars are given by CORN. LE BRUN, *Voyage par la Moscovie, en Perse*, &c.; v. 1. pp. 97, 104.

[†] ADELUNG, *loc. cit.* For portraits, see DENON, *Voyage*, &c.; pl. 106, 107: also *Description de l'Egypte;* etat moderne, coutumes et portraits, particularly, v. 2 pl. 2.

[‡] Portraits in C LE BRUN, v. 1. pl. 85—88. Representations of the ancient Persian form may be seen in the fragments of Persepolitan sculpture; ibid. v. 2. pl. 138, 142; and in the plates of antiquities in Mr. MORIER's *Travels in Persia*.

[||] DENON, *Voyage dans la Haute et Basse Egypte;* pl. 104, 105, 109, 110, 112.

[§] Some indifferent figures in ELPHINSTONE's *Account of Caubul* serve to show the physical traits.

[¶] BUCHANAN's *Journey from Madras*, &c. Portrait of KRISHNA RAJAH, curtor or sovereign of Mysore; and of NANDI RAJAH, his maternal grandfather (Hindoos;) v. 1. frontispiece, and p. 67. Portraits of three sons of TIPPOO SULTAN (Mussulmen;) v. 3. pl. 35, 36, 37.

When these numerous races are assigned to one variety, their assemblage will not be understood to indicate that they are all alike in physical and moral traits The distribution of our species into five divisions must be regarded in a very general view; and this general conformity is not inconsistent with various and strongly-marked modifications. The latter are more numerous in the Caucasian than in the other varieties; perhaps from great-

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Our knowledge of the several tribes which occupy the great Indian peninsula is not yet sufficient to enable us to class them satisfactorily. The crania of Hindoos, which I have seen, belong to the Caucasian type; and the great artist, Mr. W. Daniel, who has probably surveyed the country, the antiquities, and the people, more extensively than any other person, and whose matchless drawings have made us so well acquainted with the prodigious architectural achievements of the natives, as well as with the scenery of India, has informed me that the finest examples of such forms, both in features and general proportions, abound in India. He never saw any specimens of Negro characters, either in countenance or hair; although some tribes, as the Malabars, are very dark-colored. The sculptured representations of the human form in the oldest of their subterranean temples correspond to the physical traits of the modern Hindoos; and this conformity was particularly noticed by Mr. Morier in the caves of Canarch in Salsette.—*Second Journey, in Persia*, p 22.

There are numerous varieties, as we might expect in so extensive a region. Dubois informs us that the agriculturists are nearly as dark as Kaffers, while the Brahmans and those not exposed to the sun are comparatively light. He compares the hue of the Brahmans to copper, or rather a bright infusion of coffee. He adds, "I have seen people in the south of France as dusky as the greater number of Brahmans, and, perhaps, more so. Their women who are still more sedentary, and less exposed to the rays of the sun, are still lighter in complexion than the males." Some wild hordes on the hills and forests of Malabar are less deeply tinged than any of the castes which have been mentioned. "In the woods of the Coorga country, there is one of those communities called Malay Koodieru, who do not yield in point of complexion to the Spaniards or Portuguese."—*Description of the Character, Manners, &c. of the People of India*; ch. 15.

* Heads of Copts, Denon, pl. 105 and 108. Figures of two fresco paintings in the sepulchres of Thebes; Bruce, pl. 6 and 7. *Description de l'Egypt*; etat moderne; coutumes et portraits.

† Five portraits in Bruce, pl. 2 and 3.

or natural softness, delicacy, or flexibility of organization, concurring with the influence of more ancient and complete civilization. In surveying the distinctions of moral and intellectual endowments, we feel uncertain how much ought to be ascribed to original difference, and how much to the powerful influence of government, education, religion, and other analogous causes. I think, however, it will appear, that most of the virtues and talents which adorn and ennoble man, have existed, from early times, in a higher degree among the Celtic and German, than among the Slavonic and Oriental people; while the latter have usually displayed a more sensual character than the former.

Blumenbach is inclined to believe that the primitive form of the human race was that which belongs to the Caucasian variety, of which the most beautiful specimens are now exhibited by the Georgians, Turks, Greeks, and some Europeans. From the finely-formed skull of this race, as from a primitive configuration, the other forms descend, by an easy and simple gradation, on the one hand, to the Mongolian, and on the other to the Ethiopian variety. The greatest mental powers have been bestowed on this variety; so that they have discovered nearly all the arts and sciences: indeed almost our whole treasure of literature and knowledge has been derived from the same quarter. These nations have the most intelligent and expressive countenance, and the most beautiful bodily proportions: they occupy the middle regions of the globe, while the extremities are filled by others. The most ancient and most early civilized nations have belonged to this division; to which, also, according to the observation of Blumenbach, there is a disposition to return in the other races, as may be observed in the South Sea Islands, and in some parts of Africa; while this does not easily deviate into the dark-colored varieties.

If we admit the Caucasian to have been the primitive form of man, are we to suppose that the skin was rosy, the hair yellow or red, and the eyes blue; or that the former had a tendency to brown, and that both the latter were dark? We can have little hesitation in adopting the latter opinion: for those characters belong to all of this race, except the Germans, which have occupied only the more distant regions.

In support of the opinion, that the original stock of the human species had the characters of the Caucasian variety, it may be stated, that the part of Asia which seems to have been the cradle of the race, has always been, and still is, inhabited by tribes of that formation; and that the inhabitants of Europe, in great part may be traced back for their origin to the west of Asia. I think, however, that we have not the data necessary for establishing a satisfactory conclusion on this point. We cannot yet assume it as a point fully proved, that all the varieties of man have been produced from one and the same breed.

II. The MONGOLIAN VARIETY is characterized by olive color, which in many cases is very light, and black eyes; black, straight, strong, and thin hair; little or no beard; head of a square form, with small and low forehead; broad and flattened face, with the features running together; the glabella flat and very broad; nose small and flat: rounded cheeks projecting externally; narrow and linear aperture of the eyelids; eyes placed very obliquely; slight projection of the chin; large ears; thick lips. The stature, particularly in the countries near the North Pole, is inferior to that of Europeans.

It includes the numerous more or less rude, and in great part Nomadic tribes, which occupy central and northern Asia; as the Mongols, Calmucks, and Burats,* the Mantchoos or Mandshurs, Daourians, Tungooses, and Coreans; the Samoiedes,† Yukagirs, Coriacks, Tschutski, and Kamtschadales;‡ the Chinese‖ and Japanese;§ the inhabitants of Thibet and Bootan; those of Tungquin, Cochin-China, Ava, Pegu, Cambodia, Laos, and Siam; the Finnish races of northern Europe, as the Laplanders; and the tribes of Eskimaux extending over the northern parts of America, from Bering's Strait to the extremity of Greenland.

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* The figures in the plates of PALLAS, *Histor. nachrichten uber die Mongol. Volkerschaften*, give some idea of the general characters of the Mongolian tribes.

† *Voyage de* CORN. LE BRUN, v. 1. pl. 7, 8, 9.

‡ COOK's *Voyage to the Pacific*; pl. 75 and 76.

‖ BARROW's *Travels in China*; frontispiece, and p. 50.

§ LANGSDORFF's *Voyages*, &c. v. 1. pl. 16. p. 316.

"The Calmucks, and all the Mongolian tribes," says **Pallas**, 'are characterized by obliquity of the eyes, which are depressed towards the nose, and by the rounded internal angle of the eyelids; by thin, black, and scarcely curved eye-brows: by the nose, which is altogether small and flat, being particularly broad towards the forehead; by high cheek-bones; a round head and face. Black-brown irides, large and thick lips, short chin, white teeth remaining firm and sound even in advanced age, and large ears standing off from the head, are universal." "They are of middling size, and we see very few tall people amongst them: the women are particularly small, and very delicately formed,"[*]

That the characters of the ancient Huns corresponded to this description, may be collected from the short but expressive portrait, which **Jornandes** has drawn of **Attila**: "Forma brevis, lato pectore, capite grandiore, minutis oculis, rarus barba, canis aspersis, simo naso, teter colore, originis suæ signa restituens."

Mr. **Barrow** says, that "the Mantchoo Tatars are scarcely distinguishable from the Chinese by external appearances: the Chinese are rather taller, and of a more slender and delicate frame than the Tatars, who are in general short, thick, and robust. The small eye, elliptical at the end next the nose, is a predominating feature in the cast of both the Chinese and Tatar countenance, and they have the same high-cheek bones and pointed chins. The native color both of Chinese and Tatars seems to be that tint between a fair and a dark complexion which we distinguish by the word brunet or brunette; and shades of this complexion are deeper or lighter, according as they have been more or less exposed to the influence of climate. The women of the lower class, who labor in the fields, or who dwell in vessels, are almost invariably coarse, ill-featured, and of a deep-brown complexion, like that of the Hottentots. We saw women in China, though very few, who might pass for beauties even in Europe. A small black or dark-brown eye, a short rounded nose, generally a little flattened, lips considerably thicker than in Europeans, and black hair, are universal."[*]

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[*] Pallas. *Histor. nachricht.* Th. 1. p. 98 and 99.

Mr. Turner informs us, that "the people of Thibet have invariably black hair, small black eyes with long pointed corners, as if extended by artificial means, eye-lashes so thin as to be scarcely perceptible, and eye-brows but slightly shaded. Below the eyes is the broadest part of the face, which is rather flat, and narrows from the cheek-bones to the chin. Their skins are remarkably smooth; and most of them arrive at a very advanced age before they can boast even the earliest rudiments of a beard. Their complexion is not so dark by many shades as that of the European Portuguese."[†]

The Eskimaux are formed on the Mongolian model, although they inhabit countries so different from the abodes of the original tribes of central Asia

"The male Eskimaux have rather a prepossessing physiognomy, but with very high cheek-bones, broad foreheads, and small eyes, rather further apart than those of an European. The corners of their eyelids are drawn together so close, that none of the white is to be seen: their mouths are wide, and their teeth white and regular. The complexion is a dusky yellow, but some of the young women have a little color bursting through this dark tint. The noses of the men are rather flattened, but those of the women are rather prominent. The males, are generally speaking, between five feet five inches and five feet eight inches high, bony and broad shouldered, but do not appear to possess much muscular strength. The flesh of all the Eskimaux feels soft and flabby, which may be attributed to the nature of their food. But the most surprising peculiarity of this people is the smallness of their hands and feet."[‡]

The same characters belong to the several tribes of Eskimaux, which are scattered over the whole breadth of the American continent. **Humboldt**[*] mentions the affinity of the languages at the two extreme points; and Dr. **Clark**[†] has noticed the complete resemblance of the dresses, ornaments, weapons, &c. brought by Mr. **Chappell** from Hudson's Straits to those in a collection made by Commodore **Billings** in the north-west extremity of the continent.

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[*] *Travels in China*, p. 183-5.

[†] *Account of an Embassy to the Court of the Teshoo Lama*, p. 84-5. He observed the same character of countenance in the Regent of Thibet (p. 241;) in the person second in rank, a Mantchoo Tatar (p. 247;) and in the mother of the new Lama (p. 336.)

[‡] Chappell's *Narrative of a Voyage to Hudson's Bay*, p. 58-9.

Similar descriptions might be quoted of the other people included under this variety.

III. In the **Ethiopian Variety**, the skin and eyes are black; the hair black and woolly; the skull compressed laterally, and elongated towards the front; the forhead low, narrow, and slanting; the cheek-bones are prominent; the jaws narrow and projecting; the upper front-teeth oblique; the chin recedes. The eyes are prominent; the nose broad, thick, flat, and confused with the extended jaw; the lips, and particularly the upper one, are thick. The knees turn in, in many instances.

All the natives of Africa, not included in the first variety, belong to this.

The striking peculiarities of the African organization, and particularly the great difference between its color and our own, have led many persons to adopt the opinion of **Voltaire**,[‡] who had not a sufficient knowledge of physiology and natural history to determine the question, that the Africans belong to a distinct species. I have shown, in the preceding divisions of this article, that there is no one character so peculiar and common to the Africans, but that it is found frequently in the other varieties, and that Negroes often want it; also, that the characters of this variety run by insensible gradations into those of the neighboring races, as will be immediately perceived by comparing together different tribes of this race, as the Foulahs, Jaloffs, Mandingoes, Kaffers, and Hottentots, and carefully noting how in these gradational differences they approach to the Moors, New-Hollanders, Arabians, Chinese, &c.

Again, great stress has been laid on the fact, that the Negroes resemble, more nearly than the Europeans, the monkey tribe: the fear of being drawn into the family, even as distant relations, has, I believe, induced many to place our black brethren in a distinct species; while others have brought forwards this approximation to the simiæ, with the view of degrading the African below the standard of the human species, and thereby palliating the cruel hardships under which he groans in the islands and continent of the New World.

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[*] *Personal Narrative*, v. iii. p. 291.

[†] Chappell's *Voyage*, &c. Introductory Advertisement; and Appendix E

[‡] See the quotation of his opinion at p. 229.

It is undoubtedly true, that in many of the points, wherein the Ethiopian differs from the Caucasian variety, it comes nearer to the monkeys; viz, in the greater size of the bones of the face, compared to those of the cranium; the low and slanting forehead; the protuberance of the alveoli and teeth; the recession of the chin; the form of the ossa nasi; the position of the foramen magnum occipitale; the outline of the union of the head and trunk; the relative length of the humerus and ulna, &c. This resemblance is most unequivocally admitted by those who have minutely examined the anatomical structure of the Negro.* It appears to me, that this fact is not very important: if there are varieties of bodily formation among mankind, some one of these must approach nearer to the organization of the monkey than the others; but does this prove that the variety in which the conformity occurrs, is less man than the others? The solidungular variety of the common pig is more like the horse than other swine: do we hence infer, that the nature of this animal in general is less porcine, or more like that of the horse, than that of other pigs? The points of difference between the Negro and the European do not affect those important characters which separate man in general from the animal world: the erect attitude, the two hands, the slow developement of the body, the use of reason, and consequently perfectibility, are attributes common to both.

That very little importance can be attached to the general observation of the resemblance of the Negro and monkey, founded on external appearance, may be clearly inferred from this fact, that the same remark has been made, even by intelligent travellers, of particular people in the other varieties. REGNARD concludes his description of the Laplanders with these words: "Voilà la description de ce petit animal qu'on appelle Lapon, et l'on peut dire qu'il n'y en a point, après le singe, qui approche plus de l'homme."[*]

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* SOEMMERRING üb. *die korp. versch.* Preface p. 19, and § 69.

Cartwright thought the Eskimaux very like monkeys: he informs us, that "walking along Piccadilly one day with the two men, I took them into a shop to show them a collection of animals. We had no sooner entered, than I observed their attention rivetted on a small monkey; and I could perceive horror most strongly depicted in their countenances. At length the old man turned to me, and faultered out, "Is that an Eskimau?" I must confess that both the color and contour of the countenance had considerable resemblance to the people of their nation. On pointing out several other monkeys of different kinds, they were greatly diverted at the mistake which they had made; but were not well pleased to observe that monkeys resembled their race much more than ours."[†]

Nic. del Techo represents a native tribe in South America as "tam simiis similes, quam hominibus.[‡] Cook calls the people of the island Mallicollo "an ape-like nation:"[||] and Forster uses the same comparison; "The natives of Mallicollo are a small, nimble, slender, ill-favored set of beings, that, of all men I ever saw, border nearest upon the tribe of monkeys."[§] As the characteristic form of the head and features of the Negro are just opposite to those of the Eskimaux and native Americans, we must regard these comparisons, which cannot be correct in all the instances, as loose expressions, not meant to be interpreted literally.

Under the Ethiopian variety, as under the Caucasian and Mongolian, are included numerous nations and tribes distinguished from each other by well-marked modifications of organization and moral qualities. Nothing is more erroneous than the common notion, that all Africans have one and the same character. I have already noticed the diversities of features and skulls (see pages 284 and 311;) and equally strong distinctions are observable in general character, whether physical or moral. To the proofs of the former point before adduced, I shall here add the testimony of Dr. WINTERBOTTOM: "As great a variety of features occurs among these people as is to be met with in the nations of Europe: the sloping contracted forehead, small eyes, depressed nose, thick lips, and projecting jaws, with which the African is usually caricatured, are by no means constant traits: on the contrary, almost every gradation of countenance may be met with, from the disgusting picture too commonly drawn of them, to the finest set of European features. Want of animation does not characterize them, and faces are often met with, which express the various emotions of the mind with great energy.[*]"

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[*] *Œuvres*, t. i. p. 71.

[†] *Journal of Transactions, &c. during a Residence of nearly Sixteen Years on the Coast of Labrador*, v. 1. p. 270.

[‡] *Relat. de Caaiguarum Gente*, p. 34.

[||] *Voyage towards the South Pole*, v. 2. p. 34.

[§] *Observations on a Voyage round the World*, p. 242.

Mr. EDWARDS, who had seen them in the West Indies, regards the Foulahs as a link between the Moors and Negroes. "They are of a less glossy black than those of the Gold Coast; their hair is crisped and bushy; not woolly, but soft and silky. They have not such flat noses or thick lips as we generally include in our notion of the Negro countenance; nor have they the peculiar fetid cutaneous odour."[†] The Koromantyns from the Gold Coast are characterized by firmness of body and mind, activity, courage, and ferocity; by the greatest fortitude and contempt of death. He adduces a horrid example of these qualities in a punishment inflicted for revolt. Two of them were hung up alive in chains; one died on the eighth, the other on the ninth day, without having uttered a groan or complaint.[‡] The Eboes from the Bight of Benin "are the lowest and most wretched of all the nations of Africa."—"I cannot help observing, too, that the conformation of the face, in a great majority of them, very much resembles that of the baboon."[‖]

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[*] *Account of the Native Africans*, v. i. p. 198.

[†] *History of the West Indies*, v ii. p. 73. Mr. PARK's description coincides with this account; *Travels into the Interior Districts of Africa*. 8vo. ed. p. 25.

[‡] EDWARDS, ibid, p. 79.

[¶] Ibid. 88—9.

In some parts of Africa, intermixture with other nations may have produced occasional departures from the original type of the race. In the north, the aboriginal Berber tribes, and subsequently the Arabian or Saracen conquerors, not to mention the Phœnician, Greek, Roman, and Turkish colonists, must have mingled extensively with the Negroes. On the east, the kingdom of Abyssinia is of Arabian origin; and traces of the same people are found along the coast, nearly as far as the Cape. Europeans, and particularly the Portuguese, have had settlements on the west coast between three and four centuries. The result of such mixtures must not be confounded with native differences.

The tribes in the south of Africa are marked by strong peculiarities. The fine forms, tallness, and strength of the Kaffers, have been already observed (p. 380.) Although their hair is black and woolly, or rather short and curling, the skin is of a deep brown instead of black; they have the high forehead and prominent nose of Europeans, with thickish lips, and projecting cheek-bones. In moral qualities, arts, and civilization, they excel the true Negroes as much as in organization.*

The Hottentot race is again clearly distinguished both from the Kaffers and Negroes. I have mentioned in another place (p. 383) their very short stature. The color of the skin is a yellowish brown, or that of a faded leaf. The cheek-bones are high, and much spread out in the lateral direction, so that this is the broadest part of the face; which is suddenly contracted below to a very narrow and pointed chin. The nose is remarkably flat, and broad towards its end; but in some it is more raised. The forehead has a narrow appearance, from the great breadth across the cheeks; but it is not either contracted or low.—" The color of the eyes is a deep chesnut; they are very long and narrow, removed to a great distance from each other; and the eyelids at the extremity next to the nose, instead of forming an angle, as in Europeans, are rounded into each other, exactly like those of the Chinese, to whom, indeed, in many other points, they bear a physical resemblance."—"The hair is of a very singular nature: it does not cover the whole surface of the scalp, but grows in small tufts at certain distances from each other, and when kept short has the appearance and feel of a hard shoe-brush, with this difference, that it is curled and twisted into small round lumps about the size of a marrowfat-pea. When suffered to grow, it hangs in the neck in hard twisted tassels like fringe."* The organization of the Bosjesmen is the same in all essential points.†

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* BARROW'S *Southern Africa;* v. i. ch. 3. LICHTENSTEIN'S *Travels*, ch. 18. For excellent portraits of Kaffers, see Mr. S. DANIELL'S *African Scenery and Animals;* fol.

IV, The American Variety is characterized by a dark skin, of a more or less red tint; black, straight, and strong hair; small beard, which is generally eradicated; and a countenance and skull very similar to those of the Mongolian tribes. The forehead is low, the eyes deep, the face broad, particularly across the cheeks, which are prominent and rounded. Yet the face is not so flattened as in the Mongols; the nose and other features being more distinct and projecting.‡ The mouth is large, and the lips rather thick.‖ The forehead and vertex are in some cases deformed by art.

This variety includes all the Americans, with the exception of the Eskimaux.

The redness of the skin is not so constant, but that it varies in many instances towards a brown, and approaches in some situations to the white color. Cook states, that the natives of Nootka Sound have a color not very different from that of Europeans, but with a pale dull cast* and Bouger makes the same observation of the Peruvians on the Andes. Humboldt observes, that "the denomination of copper-colored men could never have originated in equinoctial America to designate the natives.† Mr. Birkbeck says of the natives, whom he saw in the western territory of the United States, "that their complexion is various; some are dark, others not so swarthy as myself; but I saw none of the copper-color, which I had imagined to be their universal distinctive mark."‡

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* Barrow, *lib. cit.* p. 157, 8. Dr. Somerville, *Obs. de Gente Hottentottarum* in *Medico-Chir. Trans.* v. 8. Portrait of a Hottentot; Barrow, *Travels in China*, p. 50. Kora Hottentot woman, Barrow, *Voyage to Cochin China*, p. 373. Booshuana man and woman; ibid. p. 394. But the best representations of these people and the Bosjesmen are to be seen in Mr. Daniell's *African Scenery and Animals*.

† Barrow's *Africa*, v. 1. p. 278.

‡ "If the Chaymas," says Humboldt, "and in general all the natives of South America and New Spain, resemble the Mongol race by the form of the eye, their high cheek-bones, their straight and flat hair, and the almost entire want of beard; they essentially differ from them in the form of the nose, which is pretty long, prominent through its whole length, and thick towards the nostrils, the openings of which are directed downwards, as in all the nations of the Caucasian race." *Personal Narrative*, v. 3. p. 224.

‖ For portraits of Americans, see Cook, *Voy. towards the South Pole*; vol. 2. p. 183. pl. 27, native of Tierra del Fuego; and *Voyage to the Pacific*, pl. 38, 39, 46, 47, 54, natives of the North-West Coast.

In describing the Chilians, Molina says, "Their complexion, like that of the other American nations, is of a reddish brown, but it is of a clearer hue, and readily changes to white. A tribe who dwell in the province of Baroa are of a clear white and red, without any intermixture of the copper-color.||

The most accurate observers, in various parts of the continent, have particularly noticed the imperfect developement of the forehead in the American race. "In the natives of Nootka Sound," says Cook, "the visage of most is round and full; and sometimes also broad, with high prominent cheeks; and above these the face is frequently much depressed, or seems fallen in quite across between the temples; the nose also flattening at its base, with pretty wide nostrils, and a rounded point. The forehead rather low,§ The same lowness of this region is remarked by Hearne¶ in the northern Indians; by Lewis and Clarke,** of the western tribes; by Mr. Rollin, the surgeon who accompanied La Perouse, of the natives on the western coast in 58° N.

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* "Voyage to the Pacific;" v. 2. p. 303..

† "Personal Narrative," v. 3. 223.

‡ "Notes on a Journey in America," p. 100.

|| "Civil History of Chili," p. 4.

§ "Voyage towards the South Pole," v. 2. p. 183.

¶ "Journey to the Frozen Ocean;" pp. 89 and 306.

** "Travels," p. 64. and ch. 23.

lat.[*] of the Californians,[†] and the Chilians;[‡] by Dampier, of those on the coast of Nicaragua, and the Isthmus of Darien;[||] and by Humboldt, of the Americans generally.[§] In describing the Chaymas, he says that "the forehead is small, and but little prominent. Thus, in several languages of the countries, to express the beauty of a woman, they say that she is fat, and has a narrow forehead."[¶] A singular intellectual defect has been noticed in some Americans, and may, perhaps, be connected with this peculiarity in the configuration of the head. "The Chaymas have a great difficulty in comprehending any thing that belongs to numerical relations. I never saw a single man who might not be made to say that he was eighteen or sixty years of age."[**] Wafer observed the same circumstance in the Isthmus of Darien. The Indians attempted to reckon a party of between three and four hundred persons: one of them put a grain of maise into a basket for each that passed; but they could not cast it up. Some days after, twenty or thirty of the chief men came together, and tried their skill. "But, when they could tell no further (the number probably exceeded their arithmetic,) and seemed to grow very hot and earnest in their debates about it, one of them started up, and, sorting out a lock of hair with his fingers, and shaking it, seemed to intimate the number to be great and unknown, and to put an end to the dispute. But one of them came after us, and enquired the number, in broken Spanish."[††]

Several fabulous reports have been propagated, and entertained even by writers of credit respecting the distinguishing characters of this race. The representation of their entire natural deficiency of beard has been rectified already (see p. 228 and following.) It has been asserted that the women are not subject to the menstrual discharge; and that in some places the men suckle and not the women.* A formal refutation of such fancies cannot be necessary.

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[*] "Voyage," &c. v. 3. p. 202.
[†] Ibid. 201.
[‡] "Voyage" &c. p. 200.
[||] "Voyages," &c. v. 1. p. 32; v. 2. p. 115.
[§] See the quotation at p. 319.
[¶] "Personal Narrative," v. 3. p. 223.
[**] Ibid. p. 241.
[††] "New Voyage and Description of the Isthmus of America." p. 179.

V. Malay Variety.—Brown color, from a light tawny tint, not deeper than that of the Spaniards and Portuguese, to a deep brown approaching to black. Hair black, more or less curled, and abundant. Head rather narrow; bones of the face large and prominent; nose full and broad towards the apex; large mouth.

The inhabitants of the peninsula of Malacca, of Sumatra, Java, Borneo, Celebes, and the adjacent Asiatic islands; of the Molucca, Ladrone, Phillippine, Marian, and Caroline groups; of New Holland, Van Diemen's Land, New Guinea, New Zealand, and the numberless islands scattered through the whole of the South Sea, belong to this division. It is called Malay,† because most of the tribes speak the Malay language: which may be traced, in the various ramifications of this race from Madagascar to Easter Island.

Under this variety, to which in truth, no well-marked common characters can be assigned, are included races of men very different indeed to be arranged with propriety under one and the same division, but hitherto too imperfectly known for the purposes of satisfactory arrangement.

In that division of the abodes of this race which may be called the Southern Asiatic, or East Indian islands, we find at least two very different organizations; namely, one Negro-like, black, with strongly curled hair; another, of brown or olive color, with longer hair. The first regarded as the aboriginal inhabitants, occupy some islands entirely, but are found in the larger ones in the mountainous interior parts, whither they seem to have been driven by the encroachments of newer settlers. They resemble the African Negroes in their black color, woolly hair, and general formation of the skull and features; and hence they are called, by the Dutch writers, Negroes and Moors. They are distinguished, however, by their language, and by a copious bushy beard. In Sumatra, they are called Batta: in Borneo, Biajos; in the Moluccas, Haraforas or Alfoeras; in the Phillippines, Ygolotes. They are wild, barbarous, and uncivilized, like their African kindred.

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* Clavigero, "Storia di Messico:" 4. 109.

† The term 'Malay,' says Mr. Marsden, like that of 'Moor,' in the continent of India, is almost synonymous with 'Mahomedan." "Hist. of Sumatra;" 3d ed. p. 42. These people, he says, are supposed to have come from the Peninsula of Malacca, and to have spread thence over the adjacent islands; whereas it is clearly proved that the Malays went from Sumatra to Malacca in the 12th century: "and that the indigenous inhabitants, gradually driven by them to the woods and mountains, so far from being the stock from which the Malays were propagated, are an entirely different race of men, nearly approaching in their physical characters to the Negroes of Africa," Ibid. 36.

Col. SYMES, who visited the great Andaman island on his voyage to Ava, describes the natives as seldom exceeding five feet, having slender limbs, large bellies, high shoulders, and large heads. They had woolly hair, flat noses, and thick lips; and skin of a deep sooty black. They are naked, and in a state of complete barbarism.*

The lighter colored race, with more oval countenance, longer hair, and finer forms altogether, occupy the coasts of the larger islands, and some smaller ones entirely. Many of them show their Malay origin, by their organization, language, and manners: and appear to have gradually spread from the continent over the adjacent islands. Others, however, cannot be traced so satisfactorily to this source.†

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* "Embassy to Ava," 8vo, p. 301. A similar description of them is given by the Arabian travellers in the ninth century, whose account is translated by RENADOUT, ibid. p. 296, note. "It deserves remark," the author adds, "that on the continent of India extra Gangem, figures of BOODH or BUDHOO, the Gaudma of the Birmans and Siamese, are often seen with the characteristic hair and features of the Negro." p. 302, note.

Mr. COLEBROOK's account of the physical traits, the ferocity, and the completely savage state of this race, is precisely similar to that of Col. SYMES. 'Asiatic Researches," v. 4.

† Two natives of Timor are represented by PERON, "Voy. de Decouvertes Terres Australes," t. 1. pl. 25 and 26.

In the numerous larger and smaller islands of the South Sea, extending from New Holland to Easter Island over a space of nearly 140 degrees of longitude, very various tribes are found, of light-brown or olive to black color, of woolly or long hair, tall or short, handsome or ugly; and that often very near each other, They may be arranged, as in the latter case, under two divisions; between which, however, there are several intermediate gradations forming an insensible transition from the one to the other.

1st. Negro-like men, with curly hair, occupy the south-western islands; and may, perhaps, have descended from the analogous race in the Moluccas and other East-Indian islands. They are savage, ferocious, and suspicious.*

This race is found in New Holland and Van Diemen's Land, New Guinea, New Britain, and the adjacent group sometimes called Solomon's Islands, New Georgia and the Charlotte Islands, the New Hebrides, including Tanna, Mallicollo and others, New Caledonia, and the Freejee Islands.

The remaining islands of the South Sea, from New Zealand on the west, to Easter Island, contain a race of much better organization and qualities.† In color and features, many of them approach to the Caucasian variety; while they are surpassed by none in symmetry, size, and strength. They have made considerable advances in civilization, and readily learn the arts imparted by their European visitors.

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* For portraits of this race, see COOK's "Voyage towards the South Pole," v. 2. pl. 47, Man of Mallicollo; pl. 26 and 45, Man and Woman of Tanna; pl. 39 and 48, Man and Woman of New Caledonia. COOK's "Voyage to the Pacific;" pl. 6 and 7, Man, Woman, and Child, of Van Diemen's Land. COLLINS, "Account of New South Wales," p. 439, Portrait of a Native with the prominent jaws and mouth of the Negro, PERON, "Voyage de Decouv." t. 1. pl. 8—12, and pl. 17—20, Natives of New Holland and the adjacent islands.

The papuahs of New Guinea are described by FORREST in his "Voyage to New Guinea;" and a figure of a youth of this race, with jaws as prominent as those of any African Negro, is given by Sir T. S. RAFFLES, in his "History of Java," v. 2.

† Numerous figures may be seen in COOK's "Voyage towards the South Pole;" and in the folio atlas of his "Voyage to the Pacific."

CONCLUDING ADDRESS OF THE LAST LECTURE.

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I HAVE now, Gentlemen! performed the task assigned to me by the BOARD OF CURATORS.

In judging of the execution of any design, it is right to bear in mind the object and views with which it was undertaken. I have been desirous of exhibiting to you, in the Lectures which are just concluded, the utility and applications of zoological science; and have, therefore, aimed more at illustrating principles, and the mode of employing and applying knowledge, than at collecting or bringing forwards a great number or variety of facts.

I selected the natural history of our species, because the subject is very interesting, because many of the points which it involves, embracing physiological questions of the highest importance, are closely allied to our own peculiar pursuits; and because it has not yet received a due portion of attention in this country.

I hope to have convinced you that the zoological study of man, when grounded on a knowledge of his organization and functions, and enlightened by the analogies, the contrasts, and the various aids afforded by an acquaintance with the animal kingdom in general, is the only means by which a clear insight can be gained into human nature,—into the physical and moral attributes, the comparative powers, the liability to change, or modification of the individual, the race or the variety, and consequently into the frame, capabilities, and destiny of the species. The principles furnished by such investigations are the safest guide in all branches of knowledge, of which man in any shape is the object; the only guide at least that can be trusted by those, who are determined to resort to nature for themselves, rather than blindly adopt established doctrines, or take up the ready-made notions and clever systems, so kindly provided for those who are too indolent or too timid to exercise their own observation and reason on these important topics. Such inquiries, I will venture to add, afford the only light capable of directing us through the dark regions of metaphysics, the only clue to direct our course through the intricate mazes of morals. Can we hope to proceed safely in legislation, in public institutions, in education, without that acquaintance with the physical and moral qualities of the subject for whose benefit they are designed, which such investigations are calculated to supply.

I have had occasion in the course of these Lectures to exemplify the incidental elucidations, which various questions in history, in antiquities, in the fine arts, may receive from this quarter. Anatomy and physiology would be very inconsiderable branches of general knowledge, if the facts which they supply were applicable merely to the illustration and extension of the healing art.

You may, perhaps, ask whether these pursuits, or at least these applications, are within that part of the territory of science which may be marked out as the field of medicine? whether they ought not to be deemed foreign to our immediate object—surgical practice? They are so, if surgery be regarded as a mere manual art, of which outward applications and operations are the sole ends;—if surgeons feel that they have taken a rank higher than they can maintain, and are disposed to descend quietly into their original condition of a subordinate mechanical class: contented to occupy themselves, under the sufferance and connivance of their elder medical brethren, with the few petty matters, which they had disdained as too low and trivial for persons of superior education.

But, Gentlemen! such is not the light in which the College of Surgeons, and, what is more important, in which the public regards our profession. The Legislature, in voting public money to purchase the rich collection formed by an English surgeon, and to prepare a suitable building for its safe deposit: and the Rulers of this College, in the pecuniary exertions connected with the acceptance of this precious gift, in the devotion of time and labor demanded by the necessary arrangements, and in the institution of Professorships, so well calculated to keep alive the spirit of emulation and improvement; have recognized surgery as a liberal science: and have viewed surgeons, in the free exercise of their allotted branch of the healing art, as an independent body, responsible in its professional proceedings to no superior professional jurisdiction.

It is our duty, Gentlemen ! and, I am sure, it will be not less our pleasure,—to maintain our profession in the rank thus marked out for it by public opinion. That impartial and generally enlightened tribunal will support and protect us, so long as our endeavors are honestly directed to advancing and perfecting the theory and practice of so useful an art. Our own individual credit and the dignity, honor, and reputation of our body, demand that surgeons should not be behind any other class in the profession, either in the cultivation of branches of knowledge directly connected with the healing art, or in any of the collateral pursuits less immediately attached to it. It is only in reference to such views and such objects that the Hunterian Collection could have been accepted, or can be of any use to our College. Unless rightly employed, this valuable treasure will be an incumbrance, rather than an ornament : instead of rendering service or conferring dignity, it will make our incompetence and disgrace more conspicuous.

The medical character is generally received as a certificate of education and knowledge ; and it is a passport of admission into the most cultivated society. A general acquaintance with natural knowledge is expected of us, and is absolutely necessary to answer the appeals which are constantly made to us in conversation. As general information is now so much more diffused than heretofore, our relative superiority can only be maintained by increased exertion.

In the present day, Gentlemen ! professional characters are estimated, fairly enough, according to the proportion of their knowledge and active talent : the efficacy of names and titles, like the fashion of wigs and canes, is gone by, without a chance of revival. The obsolete institutions of past ages and inefficient modern ones, meet alike with silent disregard.

The mighty impulse, which for the last century has so signally extended the boundaries of knowledge in all directions, still actuates the human mind. The astonishing occurrences of this eventful period raised it at times into irregular agitation ; that, indeed, has for the present subsided; but the force of the original movement is not at all diminished;—I think rather increased. It will, perhaps, display itself, now that political revolutions and innovations are suspended, in a more vigorous pursuit of the useful sciences, and a more active cultivation of the arts of peace.

Surgery is largely indebted to this past and present mental activity. So much have its principles, its doctrines, and its practical proceedings been modified,—I will venture to say improved, that the magnitude of the change is noticed, even by the junior members of the profession. But do not suppose that it has reached perfection; or that it is destined to stop at its present point. What has been hitherto effected, in the physiological and pathological principles of our art, has been chiefly to expose and remove errors, to clear away rubbish and incumbrances, and lay some part of the foundation. It still remains for us to erect the building. We must increase rather than relax our exertions.

The current of knowledge and improvement rushes on so strongly, that they who hesitate to commit themselves to it, will soon be left far behind; and serve only the disgraceful purpose of enabling us to measure the force and rapidity of the stream. Beware, I exhort you, of this shameful apathy, this fatal indecision; and strain every nerve to advance all branches, whether immediate or auxiliary, of the profession you have chosen! You will thus enjoy the greatest pleasure which upright and honorable minds can receive,—that of increasing the usefulness, and thereby raising the credit and respectability of the body to which you belong; you will prepare for yourselves, at all times, a pure source of the most satisfactory reflections.

Our professional ministrations introduce us to our fellow-creatures in the most endearing character,—as instruments of unquestionable benefit; not merely in alleviating or removing the severe pressure of that great evil, bodily pain, and protracting the approach of that awful moment, from which all sentient beings shrink back with instinctive dread,—the termination of existence; but in soothing the acuter anguish which near relations and friends feel for each other. Consider the responsibility attached to those decisions, on which it will depend whether a beloved wife or husband shall be saved, whether children shall be restored to their anxious parents, or parents be preserved for the benefit of their offspring. On reviewing our conduct in these trying scenes, when all our efforts have been unavailing, that nothing has been omitted, which the resources of our art rendered possible,—nothing neglected, which more diligent study, and more active pursuit of knowledge could have supplied, will be a support and a consolation. What must be the feelings of those, to whom this consolation is denied! who feel a doubt whether the fatal event has merely exemplified the limited efficacy of art, or has been owing to their own ignorance or incompetence!

These matters have, however, been already treated with such just feeling, and such persuasive eloquence, by my ingenious and most estimable Colleague,* that I desist, apprehensive that by going on I should only weaken the effect of his forcible appeals. My distinguished Coadjutor spoke of his excursions into the field of comparative anatomy, as if they required explanation or apology. By making man the principal object of my Lectures, I have imitated him in deviating apparently from the precise course marked out by our superior. I wish I could have presented to you as effectual an excuse as he did, in the bold and novel views, the striking thoughts, the acute remarks and the beautiful language of his interesting discourses!

I shall be satisfied, however, Gentlemen! if you will accord to me the humbler merits—of industry, in collecting materials; patience in arranging, combining, and reflecting on them; fidelity and independence in exhibiting to you, precisely as they appeared to my mind, the inferences and deductions that resulted from the whole.

To the Court, to the Members of this College, and to my other hearers, I am much indebted for their patient attention to fifteen long Lectures, during the extraordinary heats of this Bengal summer; particularly in the oppressive atmosphere of this unventilated theatre, and at a time of day when, in such seasons, living beings seem almost instinctively to seek repose.

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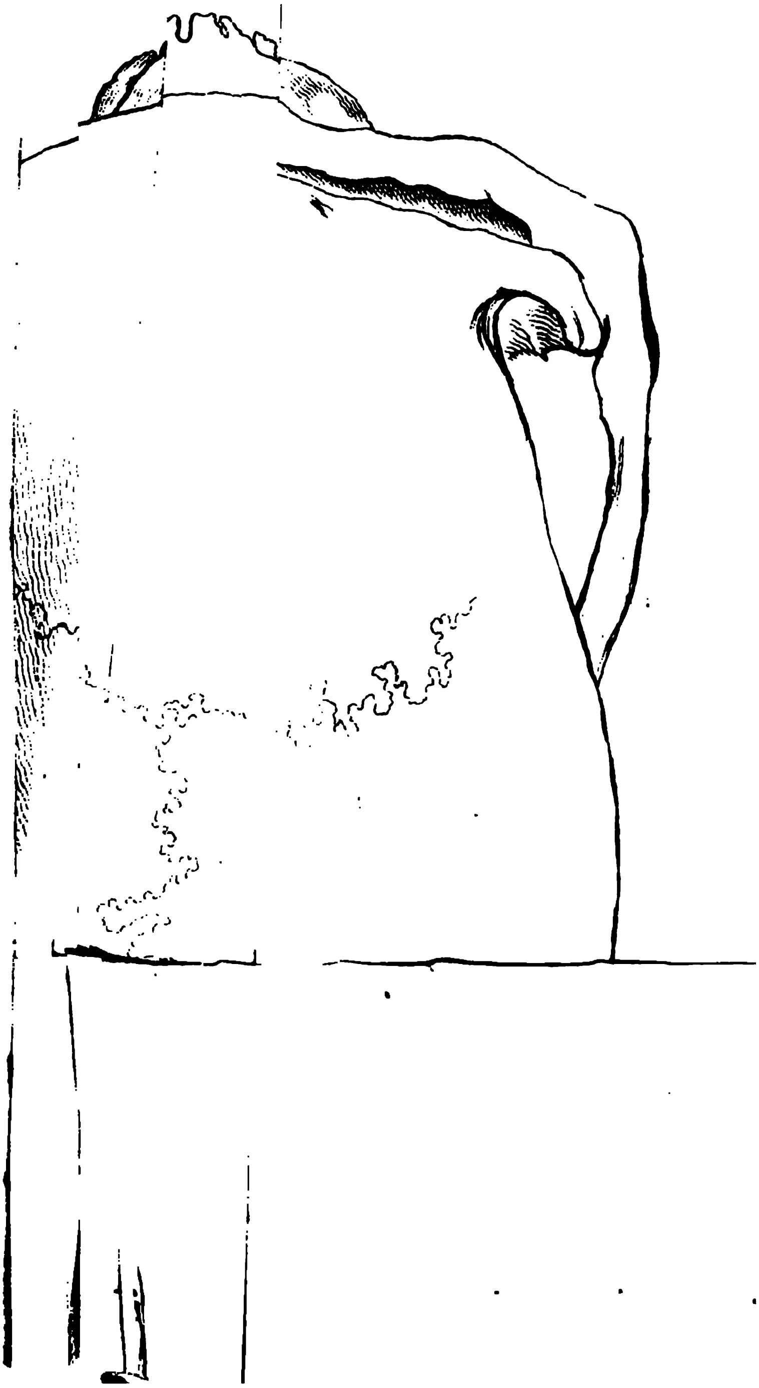
* ANT. CARLISLE, ESQ.

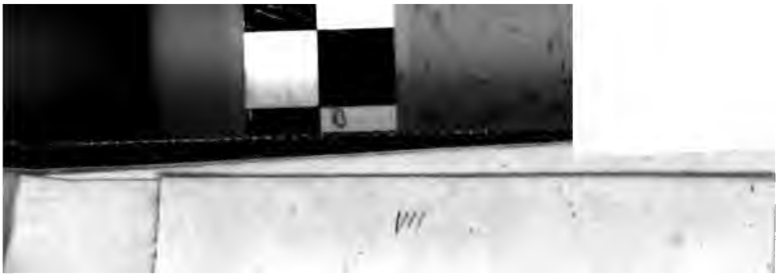
Gentlemen! I thank you very sincerely; and I wish you every success and happiness in the honorable practice of your profession.

THE END.

Georgian.

CAUCSIAN VAR.

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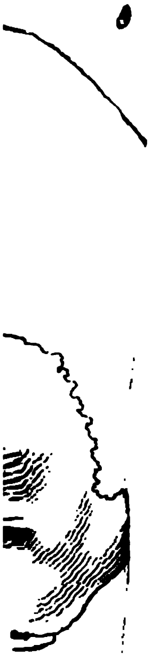

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